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The Relationship between Stress and Eating Attitudes and Behaviour in Female Dancers and Field Hockey Players

by

Cynthia Puddu

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of Masters of Science.

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DEDICATION

To all the women suffering from eating disorders who have inspired me to do my work.

ABSTRACT

This study examined the relationship between stress and eating behaviour in two different elite athletic female groups (field hockey players, ballet dancers) and a female control group. Differences in eating behaviour, stress levels and coping strategies between all three and high and low risk groups were also examined. Twenty-two field hockey players, 11 dancers and 21 recreationally active females completed the Derogatis Stress Profile (DSP), the Eating Disorder Inventory (EDI), and the Ways of Coping Questionnaire (WCQ). The height, weight, body mass index, and sum of 5 skinfolds were also assessed for each subject. Results showed that there were several positive relationships between the EDI and DSP subscales. No significant differences in EDI scores were found between the dancers and the field hockey players and controls, but controls were found to score higher than the field hockey group on several EDI subscales. Stress levels did not differ between the three groups. It was found that 'at risk' subjects had higher levels of stress, particularly in the emotional domain, than did low risk subjects. Several different coping strategies were employed in all groups but it was suggested that the at risk group used their coping strategies either inappropriately and/or ineffectively. The findings suggest that there is a relationship between stress and disordered eating tendencies yet the role of coping is still not understood.

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I. INTRODUCTION

As society's ideal of winning and being the best grows, more pressure is put on individuals to become perfect and strive to achieve nothing less than being number one. This pressure is seen in many different performance settings such as school, sports, and the arts. Although this pressure may be good initially because it motivates young people to excel and try as hard as they can, if taken too far, it can be to the detriment of the body and mind. For many athletes and dancers, this emphasis on being the best may have led to serious problems, including overtraining, injuries and the development of eating disorders (ED) (Johnson, 1994).

In addition to the pressure to perform, female athletes in some sports experience the societal pressures to conform to the thin ideal of physical perfection. Therefore, the pressure put on female athletes is twofold. This can lead to a very stressful environment which can augment the risk of overtraining, injury and disordered eating. In fact, stress has been implicated in the development of ED. Some have suggested that a stressful event has been the trigger for an ED (Tobin, Molteni, and Elin, 1995), while others suggest that patients with ED experience more stress (Greenburg, 1986), and others believe that those with ED appraise a situation as more stressful (Leal, Weise, and Dodd, 1995).

Some researchers have suggested that inappropriate coping in an environment that is highly stressful may increase the risk for developing an ED. Individuals with eating disorders may use improper coping mechanisms (Troop, Holbrey, Trowler, and Treasure, 1994), or they may use the disordered eating behaviour as a coping mechanism (Pike and Rodin, 1991).

The prevalence of ED in the general population is quite low, with 0.2-3% reported for anorexia nervosa (AN), and 0.9-13% for bulimia nervosa (BN) (Whitehouse, Cooper, Vize, Hill, and Vogel, 1992; Killian, 1994). Of these cases, 90% are female, and the incidence of AN has been increasing in females between the ages of 15 and 24 (Leon, 1991). However, there are certain populations where the prevalence rates are higher. Athletic populations, for example, have reported rates of 4.1-25.7% for AN and 8.0-39.2% for BN (Burckes-Miller & Black, 1988; Garner and Garfinkel, 1980; Garner, Garfinkel, Rockert, and Olmsted, 1987; Hamilton, Brookes-Gunn, Warren, and Hamilton, 1988; le Grange, Tibbs, and Noakes, 1994). These numbers reflect only clinically diagnosed ED patients, and do not take into consideration the many individuals that may have aberrant eating behaviours who cannot be clinically classified as eating disordered. These disorders are not dichotomous, but rather, they exist on a continuum from occasional dieting and poor eating habits to clinically diagnosed ED such as AN and BN. Along

this continuum, various behaviours are seen such as binging, purging, laxative abuse, restrictive dieting and/or fasting. Those who engage in these behaviours but who are not diagnosed with a clinical condition are said to have disordered eating tendencies (DET). Additionally, if an individual meets all but one of the criteria for AN or BN, they are considered to be sub-clinical. The prevalence rates of individuals in athletic environments who are sub-clinical have ranged from 8.2-46% (Hamilton et al., 1988; le Grange et al., 1994).

Research has shown that individuals with DET have higher potential to develop clinical ED (Garner et al., 1987), in addition to many related health problems. Repeated vomiting and laxative and/or diuretic abuse can lead to dehydration and hypokalemia. If these conditions become chronic, damage to the kidneys may result (Stephenson and Ohlrich, 1988; Goldbloom and Kennedy, 1995). These same behaviours can also result in severe electrolyte abnormalities and metabolic acidosis (Mitchell, 1995). Cardiovascular complications associated with fasting, vomiting and laxative abuse include bradycardia, orthostatic hypotension, electrocardiogram abnormalities and severe arrhythmias (Stephenson and Ohlrich; Goldbloom and Kennedy; Mitchell). Gastric dilation can occur in individuals who engage in binge eating. This can be dangerous because it can result in gastric rupture and/or death (Stephenson and Ohlrich; Mitchell).

A relatively new phenomena has been identified in the female athletic population called the 'female athlete triad' (Nattiv and Lynch, 1994). This triad includes a combination of disordered eating, a decrease in bone mineral density, and amenorrhea (an absence of menstrual periods). Alone, these physical problems are quite harmful to an individual's health; in combination, they can be deadly.

Because these behaviours seem to be getting more common (Leon, 1991) and the associated physiological effects can be very severe and detrimental, and because some research has shown that individuals with DET can later go on to develop clinical eating disorders (Garner et al., 1987), it is necessary to know what may lead individuals to engage in DET and possibly develop an ED.

Eating disorders and disordered eating tendencies are very complicated and multi-faceted problems (Cattanach and Rodin, 1988). Proposed and potential causative factors may be external to the person and/or internal. The external factors are mainly sociocultural: sociocultural emphasis on thinness, which is exaggerated in the media daily; family and friends that may pressure a young girl to lose weight; coaches in the athletic population who feel their

athletes should lose weight in order to be better competitors; and choreographers in the dance community who push the dancer to be thin in order to meet the thin standards that have been set for dancers in the past (Garner & Garfinkel, 1980).

Specific athletic and artistic environments may also contribute to the development of an ED. For example, some environments emphasize thinness in order to improve performance. One such environment is the ballet dance company (Garner & Garfinkel, 1980). In the early history of ballet, the ideal ballet dancer was large and round, much like the women that are seen in paintings of the renaissance period. However, in the last 50-60 years, the picture of the ideal dancer has changed. Now, the ideal ballet dancer must be thin and waiflike in order to look graceful and beautiful on stage (Vincent, 1989). This ideal is reinforced in many dance companies and studios throughout the world. This demand to be thin that is imposed by choreographers is seen at auditions when the dancers are weighed before the audition and then told to lose a certain amount of weight before they will be considered for an audition, let alone acceptance into the company. Gelsey Kirkland, a principal dancer with the New York City Ballet, described how George Balanchine, the company director, would treat the dancers. She claims that he would bang a dancer's sternum and rib cage with his knuckles and say to them 'I must see bones. He did not merely say "eat less". He said repeatedly, "eat nothing" ' (Kirkland, 1986, p. 56). Other similar environments include gymnastics and figure skating. In contrast, sports such as field hockey, basketball and volleyball are considered low risk because their environment does not emphasize thinness in order to improve performance (Sundgot-Borgen, 1993).

Internal factors that have been associated with ED refer to psychological constructs such as distorted body image, low self-esteem, and external locus of control (Horne, Vactor, and Emerson, 1991; Swain, Shisslak, and Crago, 1991; Wankel, et al., 1993).

Variations in body composition such as an increase in body fat or a high body mass index (BMI) have been associated with higher scores on Eating Disorder Inventory (EDI) subscales and other eating disturbances (Killen et al., 1994; Koff and Rierdan, 1993; Marshall and Harber, 1996; Paxton et al, 1991). Individuals that are relatively fatter than others may have good reason to have higher Body Dissatisfaction (BD) or Drive for Thinness (DT) scores. However, if these individuals attempt to lose weight or decrease their body fat without guidance, they may be at risk for using inappropriate weight loss measures.

Not all people who experience these internal problems and external pressures engage in

DET behaviours or go on to develop ED. There must be other factors or a combination of factors that contribute to a disordered eating response. Increased levels of stress and poor coping mechanisms may be the catalyst to triggering these behaviours.

Based on previous research on the relationship between stress, coping and ED and the fact that an elite athletic setting can be highly stressful, a model has been hypothesized for this study (Appendix A). This model was used in an attempt to show how the combination of internal and external factors with increased levels of stress and poor coping could contribute to a disordered eating response.

Statement of the Problem

Most studies in the past have looked at stress and coping in clinically diagnosed individuals. The studies that have been done on non-clinical populations have only examined non-athletic populations. Little has been done to look at stress and coping in an elite athletic population. It is important to study this population since there is a higher incidence of clinically diagnosed eating disorders and DET reported in athletic settings, and because of the health risks associated with these issues. Athletic females should also be studied because of the potential for the development of the female athlete triad, and because an elite athletic setting has the potential to be highly stressful. Also, since many individuals with DET go on to develop clinically diagnosed eating disorders (Garner et al., 1987), and because the recovery rates are very poor once a clinically diagnosed disorder has developed (only 1/3 of patients go on to completely recover (Ratnasuriya, Eisler, Szmukler, and Russel, 1991)), it is important to target individuals before they reach this stage. The purpose of this study was to determine whether there was a relationship between stress levels and eating attitudes and behaviour in elite athletic populations. It was hypothesized that there would be a positive correlation between stress and negative eating attitudes and behaviours. This study also attempted to answer several other secondary questions:

1. Do stress levels differ in different athletic populations and in non-athletic controls?

It was hypothesized that dancers would have higher stress scores than field hockey players and non-elite controls who would have lower stress scores than both dance and field hockey subjects.

2. Do DET differ in various environments?

It was hypothesized that the dance subjects would have higher scores on the DT, BD and Bulimia sub-scales of the EDI than the field hockey or control subjects.

3. Do people with high DET also suffer from higher levels of stress?

It was hypothesized that, in all three environments, individuals with higher scores on the EDI subscales would have higher stress scores.

4. Do individuals with higher DET use different coping styles?

The final hypothesis was that individuals in all groups with higher scores on the EDI subscales would use more wishful thinking and avoidance coping strategies and would seek less social support than individuals with low scores on the EDI.

Justification for the Study

Because little research has been done on stress, coping and eating disorders in elite athletes, an important population may be being ignored at this point. The literature has reported a higher incidence of ED and DET in athletes, particularly those involved in sports that emphasize leanness or contain an aesthetic component (Sundgot-Borgen, 1993). If athletes with DET also have poor coping and higher levels of stress, then a reasonable direction for prevention and intervention programs may be to teach individuals proper coping mechanisms and stress management. This would be a valuable strategy since an elite athletic setting can potentially be highly stressful. This study examined two different female athlete populations, elite field hockey players and elite dancers, along with a non-elite comparison group of similar age and gender. If similar results were found in all settings, it may suggest that something at the individual level may be what leads the person to an eating disorder. Conversely, if different responses were found between groups, it may indicate that something in that specific environment may be contributing to the eating disordered response, such as the emphasis on being thin that is found in certain athletic settings.

DEFINITIONS

Eating Disorders

Clinically diagnosable eating disorders can be classified into three different types: anorexia nervosa (AN), bulimia nervosa (BN) and eating disorders not otherwise specified (EDNOS). The diagnostic criteria for AN and BN listed in the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV, American Psychiatric Association, 1994) are contained in TABLE 1-1.

TABLE 1-1. DSM-IV (1994) Criteria for Anorexia Nervosa (AN) and Bulimia Nervosa (BN)

Anorexia Nervosa 1) refusal to maintain body weight at or above the 85th percentile for age and height 2) an intense fear of gaining weight, although underweight 3) an exaggerated disturbance in how one's body weight or shape is experienced 4) amenorrhea for three consecutive months in post-menarcheal females
Bulimia Nervosa 1) recurrent episodes of binge eating 2) recurrent behaviours to compensate for eating such as self-induced vomiting, and/or misuse of diuretics or laxatives 3) binge eating and compensatory behaviour occurring at least twice a week for 3 months on average 4) body shape and weight having an undue influence on self-evaluation 5) the disturbance does not occur during episodes of AN

Note. From American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., pp. 544-550). Washington, DC: Author.

Some of the criteria for bulimia may be seen in individuals with anorexia. However, individuals with bulimia are of normal weight and do not usually experience amenorrhea. All above listed criteria must be met in each condition in order for an individual to be diagnosed.

The DSM-IV has also included a separate classification for those that do not meet the specific criteria for either AN or BN. These disorders are classified as atypical eating disorders and are categorized as Eating Disorders Not Otherwise Specified (EDNOS). The criteria for EDNOS are listed in TABLE 1-2, and each one represents a separate atypical eating disorder.

TABLE 1-2. DSM-IV (1994) Criteria for Eating Disorders Not Otherwise Specified (EDNOS)

1) all the criteria for AN except amenorrhea 2) all the criteria for AN except the current weight is at a normal range 3) all the criteria for BN except the binge eating and purging behaviour occur less frequently than for BN 4) regular use of purging (e.g. self-induced vomiting and laxative abuse) in someone of normal weight after small amounts of food are ingested 5) chewing and spitting out, but not swallowing large amounts of food 6) binge eating disorder: use of binge eating without the purging seen in BN

Note. From American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., p. 550). Washington, DC: Author.

Recently, there has been some attention given to another group of individuals that have binge eating disorder. Although this is not an officially recognized DSM eating disorder and is still classified as an atypical eating disorder, the DSM-IV has included a set of diagnostic criteria for binge eating disorder (Fairburn and Walsh, 1995) (Table 1-3).

TABLE 1-3. DSM-IV (1994) Criteria for Binge Eating Disorder (BED)

1) recurrent episodes of binge eating
2) binge eating episodes associated with at least two of the following:
   a) eating more rapidly than normal
   b) eating until feeling uncomfortably full
   c) eating large amounts of food when not feeling physically hungry
   d) eating alone because of being embarrassed by how much one is eating
   e) feeling disgusted with oneself, depressed or very guilty after overeating
3) marked distress regarding binge eating
4) binge eating occurs, on average, at least 2 days a week for 6 months
5) binge eating is not associated with the regular use of inappropriate compensatory behaviours and does not occur exclusively during the course of AN or BN

Note. From American Psychiatric Association (1994) *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., p. 731). Washington, DC: Author.

Stress

There has been some controversy as to how stress should be defined. In the past, stress has either been viewed as a stimulus or as a response. Most recently, however, many researchers of psychiatric stress have come to agree that stress is more a process that occurs due to the relationship between the individual and the environment (Cattanach & Rodin, 1988). Lazarus and Folkman (1984) define psychological stress as "... a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (p. 19). This definition takes into consideration the complex and interactive process of stress, and also accounts for the character of the person and the nature of the environment. Because stress is a relationship process and that relationship is always changing, stress and different reactions to stress are specific to the situation and the individual. Although this definition of stress is somewhat dated, it is still currently used by many researchers. For the purposes of this study, the definition of stress by Lazarus and Folkman was used.

Coping

In general, coping is seen as cognitive and behavioural efforts to manage the internal and external demands on a person that are seen as difficult or exceeding his or her resources (Lazarus

and Folkman, 1984). These efforts are constantly changing (Coyne, Aldwin, & Lazarus, 1981). It is a process-oriented behaviour that, like stress, is situation specific, and it includes anything a person does to manage a situation whether it is effective or not.

There are two major categories of coping that have been suggested by Lazarus (1993). These are problem-focused coping, which involves managing the situation, and emotion-focused coping, which involves regulating the emotional responses to the situation. Problem-focused strategies are seen as more active efforts because they involve identifying the problem, finding alternatives and trying to change the environment or the individual to deal with the problem. In contrast, because emotion-focused strategies tend to involve avoidance, distancing and self-deception, they are seen as less active (Billings & Moos, 1981). Generally, active, problem-focused coping strategies are seen as better methods of handling stress because they have been found to moderate the influence of negative life events on psychological functioning (Pearlin & Schooler, 1978; Billings and Moos). Also, in studies on health consequences of coping strategies, Billings et al. found that avoidance coping had a positive association with psychological distress. However, because coping is a process and it is situation oriented, the type of coping strategy used may change from one stressful encounter to another and may also vary at different stages of the same stressor. Recent literature has indicated that certain types of coping that may have been seen as maladaptive in the past, may actually be appropriate depending on the situation (Lazarus, 1993). It should be noted that individuals with eating disorders have been found to use more passive strategies of coping, such as avoidance and wishful thinking. They also use fewer active strategies like seeking social support and problem solving (Grissett and Norvell, 1992; Soukup, Beiler and Terrell, 1990; Troop et al., 1994).

Definition of Elite Dancer and Field Hockey Player

'Elite' as defined by Collins (1995) is "the most powerful, rich, or gifted members of a group or community ". For the purposes of this study, this definition was used to describe an elite dancer or field hockey player. The field hockey players were members of the Canadian National Field Hockey team. These individuals went through a long selection process and were found to be the best players in the country. Therefore, if one is to define elite as ' the most gifted members of a community', these players fit this criteria. Similarly, the dancers that were studied were members of North American ballet companies which were nationally ranked. As with the field hockey players, the selection criteria for becoming a member of these companies is very strict, and only the best dancers are selected.

Trigger Factors

There is some confusion associated with the term 'trigger factor'. This is a term used in much of the literature describing what may contribute to an eating disorder. As defined by Webster (1986) a factor is 'one of the elements, circumstances, of influences which contribute to produce a result' (p. 813). A trigger can be defined as something that 'initiates, sets off or actuates" (p. 2444). Many authors interchange the two words or use the combination of both words, using the word trigger as an adjective. However, the exact mechanism that causes an eating disorder is not known, and therefore the use of trigger in the eating disorder literature may be inappropriate. At best, what has been found are variables that contribute to an eating disorder. Because of this, the word factor rather than trigger will be used to describe things that contribute to the development of ED and DET.

LIMITATIONS

There were some limitations to the study. One was the self-report nature of the instruments that were used. The subjects may not have answered the questions accurately. One other limitation was that the non-elite control group was from one geographical location and the other groups had individuals from across North America. This limited the generalizability of the controls and was also not as effective a control group as one that would have included individuals from across the country. However, obtaining subjects from universities across the country was not feasible given the time and financial limitations of this study.

With regards to assessment of coping there were two main limitations. One was that the questionnaires were administered at different times in the training calender of the athletic groups. A second limitation was that only one measure of coping was taken and this did not take into account the changing nature of coping.

II. REVIEW OF THE LITERATURE

This review will present the prevalence of ED in the general population and in athletic populations. It will then describe the literature that has discussed the role of stress, coping, pressure to be thin, low self-esteem, distorted body image and a high body composition without guidance for weight loss in the development of ED and DET.

The term anorexia nervosa (AN) was first seen in the literature in the late 19th century (Silverman, 1995). However, this first description of the disorder concerned itself only with the physical aspects of AN and did not discuss the emotional aspects of the disorder. With respect to bulimia, although clinical bulimia nervosa (BN) was defined by Russel (1979), the term 'bulimia' can be traced to many sources in Western Europe over the past 2000 years. As with AN, only the physical aspects of this disorder were described. It was not until the late 20th century that the current descriptions and understanding of these disorders were fully developed. The most recent classifications of both AN and BN can be found in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association, 1994). The specific criteria for these disorders can be found in Table 1-1. These recent definitions of AN and BN acknowledge that these disorders are not only physical, but have a psychological component that affects the individuals that have them.

There are behaviours associated with AN and BN that are called disordered eating tendencies (DET). These behaviours include sub-clinical AN and BN (all but one of the criteria for these two disorders) as well as a continuum of behaviours ranging from occasional dieting to chronic fasting, binging, vomiting and/or laxative abuse. These behaviours are more common than AN and BN. Also, as with AN and BN they are more prevalent in specific populations.

There are many theories as to what can contribute to an ED. Several factors that have been associated with ED and DET are stressful events, high levels of stress, inappropriate coping, pressure to be thin, a history of teasing, low self-esteem, distorted body image, and a high body fat without guidance for weight loss (Cattanach and Rodin, 1988; Horne et al., 1991; Leal et al., 1995; Marshall and Harber, 1996; Thompson, 1991; Tobin et al., 1995; Troop et al., 1994; Wiseman, Gray, Mosimann, and Ahrens, 1992). Certain environments such as a lean-emphasized sport or a ballet studio have also been associated with ED and DET (Garner and Garfinkel, 1980; Sundgot-Borgen, 1993).

Prevalence

The prevalence of clinically diagnosed eating disorders is low in the general population,

with 0.2-3% and 0.9-13% being reported for AN and BN, respectively (Whitehouse et al., 1992; Killian, 1994). However, the prevalence rates in specific populations have been reported as being higher than that of the general population. For example, populations of ballet dancers have reported prevalence rates ranging from 4.1-25.7% for AN and 2.8% for BN (Garner and Garfinkel, 1980; Garner et al., 1987; Hamilton et al., 1988; le Grange et al., 1994). Because ballet is an activity where a lean body is emphasized, AN is the more prevalent ED diagnosed, and the prevalence rate for bulimia in this population is low.

Various other athletic populations have shown prevalence rates of 1.3-31% for AN and 8-12% for BN (Sundgot-Borgen, 1993; Holderness, Brooks-Gunn, and Warren, 1994). However, these do not reflect the number of individuals that may be sub-clinical or have severe disordered eating tendencies. Of the few studies that have examined athletes that are sub-clinical, the rates have been reported as ranging from 8.2 - 46% (Hamilton et al., 1988; le Grange et al., 1994). This is higher than the prevalence of sub-clinical eating disorders in the general population which ranges from 3-5.4% (Whitehouse et al., 1992; Gotestam and Agras, 1995).

Stress and Eating Disorders

The research on stress and eating disorders is quite new with most of it beginning in the early 1980's. Most of the literature suggests that there is a relationship between stress and eating disorders. There have been many different relationships reported. Some have suggested that a stressful event has been a factor in the development of an eating disorder (Tobin et al., 1995), others believe that those with eating disorders have lower levels of stress tolerance (Leal et al., 1995), and others suggest that eating disordered patients experience more stress (Greenburg, 1986).

Stressful Event

A stressful event may be a factor contributing to an eating disorder. It has been reported that the majority of ED patients experienced an event that they perceived as stressful before the onset of their disorder (Schmidt, Treasure, Tiller, Blanchard and Harris, 1991). Sundgot-Borgen (1994), in interviewing a group of 603 elite female athletes in Norway, has also identified an event such as the loss of a coach, death of a significant other, family problems, or moving to a new city as a possible factor contributing to ED in athletes.

A prospective study done by Lacey, Coker, and Birtchnell (1986) found that there were several precipitating factors associated with the onset of bulimia. Lacey et al. studied 50 women (mean age = 25) who had been referred to an eating disorder clinic because they met the DSM-

III criteria for bulimia. The women were interviewed about their disorder and it was found that binge eating was precipitated by at least two of the following: sexual conflict, a major life change, and a "loss". Sexual conflict, reported by 72% of the patients, was mainly associated with the beginning or termination of a major sexual relationship. Some examples given were termination of a relationship because of a partner's infidelity, termination of the first sexual relationship, or the beginning of a major relationship that included the first sexual relationship. Examples of major changes in life, reported by 70% of patients, were leaving home to begin college, changing schools, or moving to a different country to begin a new job. Finally, a "loss", reported by 20%, was described as involving bereavement, estrangement, or separation from a significant other. Some examples were a mother being hospitalized, a parent's divorce, or death of a parent. From the total sample, 56% reported a combination of precipitating events. For example, one patient reported ending her marriage and leaving her home town to attend a new school as two precipitating factors. The fact that the majority of these subjects reported a combination of precipitating factors may indicate that it is a pile-up of stressors and not just one specific event that may trigger an eating disorder.

Tobin et al. (1995) found that a medical trauma preceded the onset of an eating disorder in women that had an early history of sexual abuse. These authors reported case studies of two Caucasian women aged 43 and 46 years and found similar patterns in both of them. Both were sexually abused as children, were very competent professional women, had suffered medical trauma, had a history of binge eating or obesity before trauma and used restrictive dieting or purging after the trauma and suffered a dissociative disorder because of the past sexual abuse. The authors believed that these women used excessive work to dissociate but when the medical trauma occurred they were not able to work any longer, and used the restrictive or purging behaviour as a substitute. Although this study examined only two individuals, the authors reported that they have found similar patterns in at least eight other individuals. Also, these case studies are important in demonstrating the role of a stressful event in the onset of an eating disorder.

These studies have shown that stressful events may be associated with the onset of eating disorders. However, one specific event may not be the only factor affecting eating behaviour but it may possibly be the catalyst for the eating disordered behaviour. Tobin et al. (1995) found that the medical trauma preceded the eating disordered behaviour in both subjects, but there were many other factors in their lives that could have influenced the eating disorders such as the

sexual abuse. This supports the work of Lacey et al. (1986), who suggested it was a pile-up of stressors and not just one specific event that may trigger an ED.

Meyer (1997) also demonstrated that individuals with disordered eating tendencies had experienced a recent stressor and also lived with a chronic stressor. Meyer studied 98 female undergraduate students ranging from 18-35 years of age to examine if there were similarities between codependency and DET and also to explore the association between codependency, DET and stress. The subjects were given the Codependency assessment (CA) (Potter-Efron and Potter-Efron, 1989) to assess codependency, the Eating Disorder Inventory-2 (EDI-2) (Garner, 1991) to assess DET, and the Differentiation of Self Scale (DS) (Olver, Aries, & Batgos, 1989) to measure self-other differentiation. A demographic questionnaire was also administered to gather information about age, parent's marital status, residence, association with chemically dependent persons and experiences with chronic stressors. Individuals were considered to be codependent if they scored over the 25th percentile on the CA.

Meyer (1997) found that 50 (53.6%) of the participants were found to be codependent. These individuals were significantly more likely to have experienced a stressful event. These individuals also scored significantly higher on the EDI than did the non-codependent group. Therefore, this supports the work of Tobin et al. (1995) that suggests individuals with DET and ED reported a stressful event before the onset of an eating disorder.

A past stressful event has also been associated with eating disorders (Dansky, Brewerton, Kilpatrick and O'Neil, 1997). The authors studied 3006 females involved in the USA National Women's Study to determine if a previous experience with crime victimization was related to BN and binge eating disorder (BED). Crime victimization was defined as unwanted sexual advances, rape, sexual molestation, and aggravated assault. Subjects were tested through a phone interview and screened for sexual harassment, major depression, trauma history, dieting behaviour, BN, BED and post traumatic stress disorder (PTSD). Individuals were assessed over the phone and diagnosed with BN or BED if they met the DSM-IV criteria for either disorder (APA, 1994). Because personal interviews were not used for diagnosis, there may have been some individuals that were improperly diagnosed with these disorders. This may have affected the results. The authors found that the BN group had a significantly higher prevalence of criminal victimization than the controls. No differences were found between the controls and the BED group indicating that the trauma may have an effect on purging behaviour rather than binging. PTSD was also found to be significantly higher in the BN group than

controls. This supports the notion that a past traumatic incident, especially one involving sexual abuse, can influence eating disorders (Tobin et al., 1995).

Lower Stress Tolerance

Some researchers suggest that the problem may be that individuals with eating disorders have lower levels of stress tolerance. Leal et al. (1995) studied 431 undergraduate students to determine whether there was a relationship between stress tolerance and symptoms of BN and whether there would be gender differences in this relationship. The 431 subjects included 299 females and 132 males with an age range of 17 to 22 years. To measure for BN symptoms, the students were given the Bulimia Test-Revised (BULIT-R) (Thelen, Farmer, Wonderlich, & Smith, 1991), which is a self-report questionnaire designed to assess bulimic symptoms. Stress tolerance was measured using NPF (a measure of stress tolerance and adjustment that is entitled with initials only) (Krug, 1992). The authors found that those with high scores on the BULIT-R had lower levels of stress tolerance. Although female subjects had significantly higher scores on the BULIT-R than males, it was found that both females and males who had higher scores on the BULIT-R also had lower levels of stress tolerance. Because the subjects did not have clinically diagnosed ED, this study suggests that lower levels of stress tolerance can be a factor contributing to DET.

Higher Levels of Stress

Higher levels of stress have also been reported in individuals with eating disorders (Soukup, et al., 1990). Soukup et al. studied 45 female inpatients at an eating disorder clinic who had met the DSM-III criteria for either AN or BN and a non-eating disordered control group to compare the stress levels and coping styles between the different groups. Thirty-three of the subjects were diagnosed with BN (mean age = 22.8), and the remaining 12 met the criteria for AN (mean age = 25.3). The control group consisted of 26 female university students (mean age = 21.5).

The subjects were given four questionnaires. The Eating Disorder Inventory (EDI) was used to measure eating attitudes and behaviours, the Life Experiences Survey (LES) (Sarason, Johnson, and Siegel, 1978) was given to measure life stresses experienced in daily life, the Derogatis Stress Profile (DSP) (Derogatis, 1982) was given to measure the amount of stress the individual was experiencing, and the Problem Solving Inventory (PSI) (Heppner and Peterson, 1982) was used to measure the individual's perception of their problem solving ability, behaviour and attitudes. The authors found that only the patients with BN reported significantly

higher levels of stress than did the controls. However, the group of subjects with AN was quite small and significance may not have been reached because of the small numbers.

There may be some factors that can increase the levels of stress in an individual. These factors can also contribute to the development of an eating disorder (Cattanach, Malley & Rodin, 1988; Thompson, 1991; Wifley & Rodin, 1995). Of these factors, some are external to the individual and some are internal.

External Factors

Sociocultural Factors

Many different external factors have been implicated in causing an individual to resort to ED. One of the factors is the current sociocultural emphasis on thinness. Young women are constantly bombarded with images of successful, beautiful and thin women. Thinness is portrayed as a prerequisite to success. This constant reminder of thin being important has caused many women to be dissatisfied with their bodies and pursue thinness at any cost (Wifley & Rodin, 1995). Several older studies have shown that many normal weight young adolescents engage in restrictive dieting and fasting because of their perceptions of being too fat (Fairburn and Cooper, 1982; Johnson-Sabine, Wook, Mann, and Wakelin, 1985; Kagan and Squires, 1985; Rodin, Silberstein, and Striegel-Moore, 1985).

More recently, Wiseman et al., (1992) have shown that the ideal female body type in North America has been getting thinner over time. In a study that investigated the cultural expectations of thinness in women, Wiseman et al. collected age and body measurements including height, hip size, bust size, waist size, and weight for *Playboy* magazine centrefolds from 1979-1988 and for Miss America contestants from 1979-1985. The authors found that there was a significant decrease in body size for the Miss America contestants in the time period that they followed. Also, they found that 69% of the *Playboy* centrefolds and 60% of the Miss America pageant contestants were 15% or more below the expected weight for their age and height. These findings support the idea that the North American ideal for a woman's body size is getting thinner. This pressure to be thin may lead to disordered eating behaviour.

The effects of this societal pressure to be thin on eating behaviours were examined by Stice, Schupak-Neuberg, Shaw and Stein (1994). The authors conducted a study to examine the relationship between media exposure and eating disorder symptoms. They hypothesized that exposure to media that has a high proportion of weight loss articles and advertisements and that depict a thin body type as ideal would directly impact eating disorder symptomatology.

In their study, Stice et al. (1994) surveyed 238 female university students (mean age= 20 years) using a 10 page questionnaire. Media exposure was measured using a 6-item scale developed by the authors. Ideal-body stereotype internalization was measured with a questionnaire developed by the authors. Body dissatisfaction was measured using the Body Dissatisfaction scale of the EDI (Garner, Olmsted and Polivy, 1983), and eating disorder symptomatology was measured using the 26-item Eating Attitudes Test developed by Garner, Olmsted, Bohr and Garfinkel (1982). The authors found that there was a significant direct effect of media exposure to eating disorder symptomatology. They also found a significant relationship between body dissatisfaction and eating pathology. These results help support the belief that the thin ideal that is portrayed in the media has an effect on disordered eating. However, some caution should be taken when interpreting these results because some of the questionnaires used were developed by the authors and no validity or reliability studies were conducted. This may have affected the results of the study.

History of Teasing

Along with the societal pressure to be thin, many young women experience pressure from parents and peers. It has been recently suggested that a history of teasing about one's appearance can have an impact on eating behaviours (Fabian and Thompson, 1989; Thompson, 1991; Thompson and Heinberg, 1993).

Fabian and Thompson (1989) conducted a study to further their knowledge of the relationship between eating disturbances, body image, depression, self-esteem and teasing in adolescents. They recruited 61 premenarcheal girls (mean age = 11.3) and 60 postmenarcheal girls (mean age = 13.3) and measured size estimation, self-esteem, body satisfaction, depression, eating disturbances, and history of teasing. Size estimation was measured by an adjustable light beam apparatus used by Thompson and Thompson (1986). This apparatus has the subject adjust the light beam to approximate the width of a certain body part and then this approximation is compared to the actual size of the body part to determine if the subject has overestimated or underestimated their size. The other variables were measured using the Coopersmith Self-Esteem Inventory (Coopersmith, 1981), the Body Esteem Scale (Mendelson and White, 1985), the Children's Depression Inventory (Kovacs and Beck, 1977), the Drive for Thinness Scale of the EDI, and a 2-item questionnaire for history of teasing developed by the authors. Fabian and Thompson found that teasing history had a significant effect on body esteem and eating disturbance in both pre and postmenarcheal girls. However, caution should be used when

interpreting these results because only the Drive for Thinness sub-scale of EDI was administered and used. Garner, Olmstead, and Polivy (1984) suggest that the entire EDI questionnaire be administered in order to decrease response bias and to maximize the validity of the subscales.

Thompson (1991) studied 120 female undergraduate students (aged 17 - 25) to determine whether body image disturbances and a history of teasing in childhood had an impact on eating behaviours later in life. The subjects were given nine figure drawings used by Fallon and Rozin (1985) to assess body image disturbance. They also completed the Bulimia Test (BULIT, Smith and Thelen, 1984) to assess bulimic symptoms, the Body Self Relations Questionnaire (BSRQ-PAE, Noles, Cash and Winstead, 1985) to assess overall satisfaction with physical appearance, and two Likert (1-5 scale) questions developed by the author to assess teasing history. Once the questionnaires were given, 20 individuals with the highest scores on the BULIT were assigned as the eating-disturbed group, and 20 subjects with the lowest BULIT scores were assigned as the asymptomatic group. Thompson found that the eating-disturbed group had a higher body image disturbance and were more dissatisfied with their general appearance. Also, the eating-disturbed group had a significantly greater history of teasing frequency than the asymptomatic group and the teasing experience affected them more than the asymptomatic group. However, because an arbitrary cutoff point (BULIT >90) was used to determine the symptomatic group, some individuals who may have been at risk for BN may have been left out and conversely, some of the individuals who were included in the symptomatic group may not have been at risk. This should be considered when interpreting the results of this study.

Another study by Thompson and Heinburg (1993) supports the findings of Fabian et al. (1989) and Thompson (1991) on the role of teasing history on eating disturbances. One hundred and forty six female college students (ages 17-25 years) were investigated in this study. The authors measured eating disturbances, body image, teasing history, social comparison, depression and self-esteem. To assess eating disturbance, the Drive for Thinness and Bulimia subscales of the EDI were used. Body image was assessed using the Body Dissatisfaction subsale of the EDI and the Figure Rating Scale (Stunkard, Sorenson, and Schulsinger, 1983). The Physical Appearance Related Teasing Scale (PARTS, Thompson, Fabian, Moulton, Dunn and Altabe, 1991) was used to measure teasing history. Social comparison was measured using the Physical Appearance Comparison Scale (PACS, Thompson, Heinberg and Tantleff, 1991). To measure depression and self-esteem the authors used the Self-Rating Depression Scale (SDS,

Zung, 1965) and the Rosenberg Self-Esteem Scale (RSE, Rosenberg, 1965), respectively. Their results showed that a history of teasing about weight and size had a significant effect on body image and eating disturbance in later life.

The results of these studies have shown teasing history as another possible factor that may influence the onset of disordered eating tendencies. Some caution should be taken when interpreting these results because of the measures that have been used. Firstly, when the EDI was used to measure eating disturbance or body dissatisfaction only the individual subscales of Drive for Thinness and Body Dissatisfaction were administered and not the entire EDI questionnaire. Garner et al. (1984) have stated that the entire questionnaire must be administered to obtain the most accurate results. Secondly, the measures used for teasing history by Fabian and Thompson (1989) and Thompson (1991) were questions developed by the authors that had not been previously validated. However, the study by Thompson and Heinberg (1993) used the PARTS questionnaire which was a validated and standardized test developed by Thompson et al. (1991) based on the previous questions.

Athletic Environment

Participation in activities that encourage thinness and control over body shape may also be a factor in the development of ED. Garner et al. (1980) studied 183 professional ballet dancers (mean age = 18.6), 56 modelling students (mean age = 21.4), 68 AN patients (mean age = 23.2), 35 music students (mean age = 15.2), and 81 normal controls (mean age = 21.5) to determine which populations would have a higher prevalence of AN and 'anorexic like' symptoms. The authors hypothesized that the dancers and the models would have the higher prevalence because their professions emphasize thinness as an important part of their jobs. The subjects were given the 40-item Eating Attitudes Test (EAT-40) (Garner and Garfinkel, 1979) to determine who would be at risk for AN. Individuals scoring 30 or more on the EAT-40 were then interviewed clinically to determine if they met the criteria for anorexia nervosa.

The results showed that 12 (6.5%) of the dancers met the criteria for AN. Of the modelling students involved, 4 (7%) were clinically diagnosed with AN. None of the controls met the criteria for AN. Therefore, as a group, the dancers and models reported a much higher incidence of AN than did controls. This supports the assertion that individuals in environments that emphasize thinness are at a higher risk of developing eating disorders.

Sundgot-Borgen (1993) also found that more athletes than controls met diagnostic criteria for ED, and that there was a higher incidence of ED and pathogenic weight control

methods in those athletes in sports where leanness was considered important. Sundgot-Borgen analysed questionnaires and interviews of 522 elite female athletes and 448 female controls to determine the prevalence of AN, BN, and anorexia athletica (AA) in Norwegian elite female athletes. The criteria for AA used by the author were: weight loss, menstrual dysfunction, GI complaints, weight reduction with no medical illness or affective disorder, distorted body image, excessive fear of weight gain, caloric intake less than 1200 cal/day, use of purging, binging, and compulsive exercise. The athletes represented 35 different sports that were divided into the following groups: technical, endurance, aesthetic, weight dependent, ball-game, and power sports. These six groups were then separated into two different categories. The first category included athletes that competed in sports in which leanness was considered important. The endurance, aesthetic and weight dependent sports were included in this category. The second contained athletes whose sports did not emphasize leanness. These included the technical, ball-game and power sports.

The subjects were given the EDI (Garner, et al., 1984) to determine who was 'at risk' for developing an eating disorder. Sundgot-Borgen (1993) considered 'at risk' as having high Body Dissatisfaction (BD) and Drive for Thinness (DT) scores and a total EDI score ≥ 40. Those that were considered 'at risk' were then invited to participate in an interview and clinical study to determine if they met the diagnostic criteria for AN, BN, and AA. Non- athletic 'at risk' subjects, athletic and non-athletic controls (individuals with total EDI <40 and normal ranges of BD and DT) were also asked to take part in the clinical study. The DSM-III-R (American Psychiatric Association, 1987) criteria were used to diagnose AN and BN. Anorexia athletica was diagnosed using a modified version of the criteria set by Pugliese, Lifshitz, Grad, Fort, and Marks-Katz (1983).

From the EDI, 117 (22%) of the athletes and 116 (26%) of the non-athletic controls were classified as 'at risk'. Thirty subjects from each group (ie. athletic controls, at-risk non-athletes, non-athletic controls) were randomly chosen. All were interviewed and clinically examined. After the interview, 27 (89%) of the 'at risk' athletes and 6 (20%) of the 'at risk' non-athletes actually met the criteria for either AN, BN, or AA. None of the athletic or non-athletic controls met the criteria for any of the ED.

These results show that a significantly higher percentage of athletes actually had a clinically diagnosed eating disorder. When different sporting groups were analysed, it was found that eating disorders were significantly more prevalent in the aesthetic (34%) and weight

dependent sports (27%), than in the endurance (20%), technical (13%) and ball-game sports (11%).

It should be noted that the EDI cut-offs set by the author can lead to erroneous results. Garner et al. (1984) state that total EDI should not be used to determine whether individuals are at risk for eating disorders. Also, Sundgot-Borgen (1993) used 'high' Body Dissatisfaction and Drive for Thinness scores as determinants of 'at risk', but did not give a specific cut-off. Consequently, some individuals that were 'at risk' may have been left out of the clinical study because they did not meet the cut-off, and others that were not 'at risk' may have been included. However, because clinical interviews were used to diagnose eating disorders, the prevalence rates reported in those found to be 'at risk' should be considered accurate, but because the arbitrary cutoff points may have excluded some individuals the prevalence may be somewhat higher than was reported.

Stress in the Ballet Dance Community

Some athletic environments can be more stressful than others. One such environment is the ballet dance studio. A ballet dance studio or company can be a very stressful environment for a dancer. Most of the literature that has been written on the types of stressors that dancers encounter has been qualitative in nature. These studies rely mainly on personal accounts and/or interviews with current and former dancers. There is little, if any, quantitative research on the types and amounts of stress that a dancer encounters.

There are many factors that are inherent to the ballet subculture that can lead to increased stress. In addition to the obvious stress of performance, other stressors that are present include: pressures to remain healthy, but at the same time, maintain an unrealistically low weight; pressure to abide by the dance hierarchy and conform to set rules that have been established over many years; constant competition with fellow dancers; and very erratic work and touring schedules (Bauer, 1990; Hamilton, 1990; Hamilton, Hamilton, Meltzer, Marshall and Molnar, 1989; Hanna, 1990; Schnitt and Schnitt, 1988; Taylor and Taylor, 1995).

The structured environment of the ballet world can be very difficult for a dancer. This structured environment has changed very little over several hundreds of years, and therefore, any change or deviation from the norm is unacceptable. This structure is seen in every aspect of a dancer's life from the movements they make to how they portray their feelings. Dancers are supposed to listen to and obey everything that is said by either a dance instructor, choreographer and/or dance master (Schnitt and Schnitt, 1988).

Lee (1995) describes how this pressure to conform affects the dancer. Lee used qualitative methods with former and current dancers to try to explore the experiences of a professional ballet dancer from the perspective of women's or developmental psychology. She describes how the structure of the ballet world tends to 'mute' the individual. The constant obedience that is encouraged, the pressure to conform, and the control that is established over the dancers can cause a young dancer to lose a sense of their own identity. This pressure to conform is first seen when the dancer is very young. At this time conforming is not difficult, but as one reaches adolescence this may become quite stressful. Adolescence can be a time of discovery and at times rebellion. This contrasts with the unchanging nature of the ballet world and therefore, an adolescent dancer that may feel the need to experiment and at times oppose the views of the dance hierarchy may find herself in constant conflict with her instructors and possibly peers.

Competition among peers can also be very stressful (Hanna, 1990). Once a dancer begins to train seriously, the majority of her time is spent at the studio. Because of this, little time is left to meet with family and friends that are outside the dance community (Horosko and Coopersmith, 1987). Consequently, close friendships are made with other dancers. This can become a problem when the dancers must compete for the same role or position in the company. A person that was once a good friend becomes someone that can take away a dream and what can be seen as healthy competition can lead to loss of friendships and long term stress (Schnitt and Schnitt, 1988).

Finally, long and erratic rehearsal and performance schedules can become quite stressful for a dancer. This was seen by Hamilton et al. (1989) in one of the few quantitative studies that have been conducted on the stress patterns of dancers. Hamilton et al. studied 14 female and 15 male dancers (age range = 22-41 years) to examine the personalities, stresses and injury patterns of professional ballet dancers in the United States. Subjects were given a demographic questionnaire to measure age, education, dance training and entry into the professional company. Injury patterns were assessed by interviewing the dancers and taking a complete injury history. Psychological status was measured using the Adult Personality Inventory (API, Krug, 1984) and the Manual for Measures of Occupational Stress, Strain and Coping (Osipow and Spokane, 1983). The results showed erratic work schedules, personal isolation and no recreational time as being causes of increased stress in the dancers' lives. It is interesting to note that the male dancers reported more occupational stress and difficulty coping than did the female dancers.

This was attributed to the 'feminine' nature of ballet that may be at odds with the masculine identity.

Internal Factors

Internal factors refer to traits that are part of the individual's personality. These include psychological constructs such as distorted body image, low self-esteem, and external locus of control.

Body Image

There has been some controversy on the subject of distorted body image being a factor associated with ED. Some suggest that because a distorted body image has been seen in the majority of the population, it should not be considered when diagnosing ED (Fairburn and Garner, 1988). However, an exaggerated disturbance in body image will be seen in most ED patients. In fact, the DSM-IV manual (American Psychiatric Association, 1994, pp.544-545) lists " a disturbance in body weight or shape, undue influence of body weight or shape on self-evaluation, or denial of seriousness of current low body weight" as one of the criteria for AN. Disturbance in body shape and weight is also used as a criterion for BN. Several authors have reported a distorted body image and body dissatisfaction in eating disordered patients and in individuals with disordered eating behaviours (Fabian and Thompson, 1989; Horne et al., 1991; Paxton, et al., 1991; Thompson, 1991; Sunday, Halmi, Werdann, and Levey, 1992; Thompson and Heinburg, 1993).

Horne et al. (1991) conducted a study to determine whether patients with eating disorders experienced more body image disturbances than a group of non-eating disordered controls. They studied 214 patients with eating disorders and 61 controls. The eating disorder group was further divided into 3 separate groups: individuals with AN only (n = 87), individuals with AN and BN (n = 72), and individuals with BN only (n = 55). Individuals in all three groups met the DSM-III-R criteria for their respective disorders. Body image distortion was measured by having the subjects rate their body size and state their desired body size at seven points and then taking the actual measurements at each point. Distortion was calculated using the perceived body size divided by actual body size. The results showed that all 3 eating disordered groups had significantly greater body image distortions than did controls. Also, there were no significant differences in distortion between the 3 eating disorder groups indicating that body image distortion is seen regardless of the type of eating disorder. This was an important finding, because the DSM-III-R did not include body image distortion in its criteria for BN. Body image

distortion has been added to the criteria in the DSM-IV.

Sunday et al. (1992) examined 150 patients with eating disorders, 23 obese subjects and 136 normal weight control subjects to study the differences in body size estimation in the 3 groups. The eating disordered patients were divided into 4 sub-groups: AN patients (n=54), patients with both AN and BN (n=44), BN patients without a history of AN (n=28), and BN with a history of AN (n=24). The normal weight controls were also divided into 2 groups: unrestrained eaters or non-dieters (n=59), and restrained eaters or dieters (n=72). The subjects were administered the EDI (Garner et al., 1983) and a body size estimation task developed by Casper, Halmi, Boldberg, Eckert and Davis (1979). The authors found that all 4 eating disordered groups had significantly higher body size distortion than did the obese patients and both control groups. There were no significant differences in body distortion between the different subjects with eating disorders. Also, it was found that, among the eating disordered subjects, the degree of body distortion was positively related to their DT and BD scores of the EDI.

Because body image distortion is one of the criteria for both AN and BN, it is not surprising that these past two studies found significant differences in body distortion between ED patients and controls. However, other researchers have found that individuals with DET also have a distorted body image (Thompson, 1991; Thompson and Heinberg, 1993). This is important in showing that body image distortion may be one of the possible factors that contributes to the development of eating disorders.

The studies by Thompson (1991) and Thompson and Heinberg (1993) described earlier also examined the relationship between eating disturbances and body image. Thompson found that individuals in the eating-disturbed group felt larger than the asymptomatic group, and also, rated how others saw them as larger. Thompson and Heinberg showed that distorted body image was related to an increase in the Body Dissatisfaction and Bulimia subscales of the EDI.

The results from these studies show that body image disturbances are seen not only in clinically diagnosed eating disorders but also in individuals with disordered eating tendencies. This is an important finding because distorted body image can be used as a criteria for determining who may be at risk for an eating disorder. Also, it may be a factor, that in combination with other risk factors, may trigger an eating disorder.

Self-Esteem

Another factor that may influence the onset of an ED is low self-esteem. A lower self-

esteem may lead to increased body distortion and body dissatisfaction. Cattanach, Malley, & Robin (1988) found that subjects with eating disordered tendencies reported lower self-esteem than did controls. In their study, 84 individuals were administered 4 sub-scales of the EDI (Perfectionism, Ineffectiveness, Drive for Thinness, and Bulimia). Thirty individuals were selected from the initial 84 and divided into an eating disordered group (n=15) and a non eating disordered control group (n=15) on the basis of scores on the Bulimia subscale. Individuals were classified as eating disordered if they scored 3 or higher on the Bulimia sub-scale of the EDI and control if they scored lower than 1 on the Bulimia sub-scale. To measure self-esteem, the subjects were administered items from the Self-esteem and Mastery factors developed by Pearlin and Schooler (1978). The results showed that the eating disordered group had significantly lower levels of self esteem than did controls.

Low self esteem was also found in those with eating disturbances in the studies described earlier by Fabian and Thompson (1989) and Thompson and Heinberg (1993). Fabian and Thompson found that in a regression analysis, self-esteem accounted for a significant amount of variance in eating disturbance. Thompson and Heinberg found that low self-esteem was a significant predictor of eating disturbance.

Body Composition

Variations in body composition, such as an increase in body fat or a high body mass index (BMI), have been associated with higher scores on EDI subscales and other eating disturbances (Killen et al., 1994; Koff and Rierdan, 1993; Marshall and Harber, 1996; Paxton et al, 1991). Individuals that are relatively fatter than others may have good reason to have higher Body Dissatisfaction or Drive for Thinness scores. However, if these individuals attempt to lose weight or decrease their body fat without guidance, they may be at risk for using inappropriate weight loss measures.

Very few researchers examining disordered eating tendencies have actually measured body composition. Also, the most common measure of body composition that has been used is BMI, often calculated from self-reported height and weight. Skinfold measures were found in only two studies (Killen et al., 1994; Marshall and Harber, 1996).

Koff and Rierdan (1993) used BMI as a measure of body fatness in their study. They examined 209 grade 6 females to determine whether advanced pubertal development was a risk factor for eating disturbance. Measures used to determine eating related concerns were the EDI and four separate questions that asked whether they felt they were under or overweight; whether

they wished to gain, lose, or stay at the same weight; whether they were dieting; and how often they dieted. Menstrual status was determined by asking the subjects whether they had started menstruating and if they had, when. Pubertal development was determined using the Tanner (1978) stages of breast development. BMI, which is calculated by weight(kg)/height(m^2), was used to determine body fatness. Body satisfaction was measured using the Body Esteem Scale. Koff and Reirdan found that subjects who were advanced in pubertal development had higher BMI's and also had higher scores on the Drive for Thinness, Body Dissatisfaction and Bulimia subscales of the EDI. It should be noted that although the girls with higher EDI score had higher BMI's, they were not considered overweight by the United States national standards for BMI (National Centre for Health Statistics, 1987). Also, because of the growth spurts that occur during puberty, BMI may not be an appropriate measure of body composition in children of this age.

A study done by Paxton et al. (1991) had similar results to those of the previous authors. Paxton et al. studied 341 female and 221 male high school students in Melbourne, Australia (age range = 11-18 years; mean age = 14) to assess body image and weight loss beliefs and behaviours in adolescents. The Drive for Thinness and the Body Dissatisfaction subscales of the EDI and the Body Figure Perception Questionnaire were used to assess body image attitudes. An 8-item questionnaire was used to measure the perceived impact of being thinner and a 4-item Satisfaction with Fitness Scale was constructed by the authors to assess satisfaction with physical ability. This scale was assessed with a preliminary sample of 60 nursing students and adolescents. Alpha levels for that sample were reported at .83. For this sample the authors reported alpha levels of .85 for females and .84 for males. To assess weight loss behaviours, an Eating and Dieting Questionnaire was constructed by the authors. No reliability measures were reported for the scale. A correlation analysis found a moderate positive correlation between BMI and the Body Dissatisfaction subscale ($r = .54$) and between BMI and the Drive for Thinness subscale ($r = .48$) in the girls. The correlations for the boys were also positive but smaller ($r = .33$; $r = .26$). These results indicate that the higher the BMI the greater the body dissatisfaction and desire to be thinner. No analysis was done to determine if there was a relationship between BMI and dieting behaviour or between EDI scores and dieting behaviour. This analysis would have been important to determine if individuals with high BMI's and/or high EDI scores use inappropriate weight loss behaviours. Also, the reliability of some of the self-report measures that were constructed by the authors is questionable because no pilot tests were conducted to

assess the reliability and validity of the measures.

Killen et al. (1994) studied 939 grade 6 and 7 female students to determine risk factors that may be associated with disordered eating symptoms. The subjects were given the EDI and Restraint scale (Herman, Polivy, Plainer and Threlkeld, 1978) to measure eating behaviour and attitudes. The Centre for Epidemiologic Studies Depression Scale (CES-D) (Weissman, Orvaschel, and Padian, 1980) and the Depression Self-Rating Scale (DSRS) (Asarnow and Carlson, 1985) were used to measure depression. The Family Adaptability and Cohesion Evaluation Scale (FACES) (Olson, Portner, and Winstead, 1985) was used to assess perceptions of the individual's family. Pubertal development was assessed using Tanner's standard photographs. Body composition was assessed using BMI, triceps skinfold thickness and waist-to-hip ratio. A structured clinical interview was also conducted to evaluate symptoms of bulimia. These were conducted by 10 graduate students who used the bulimia nervosa section of the Structured Clinical Interview for DSM-III-R (Non patient version) (SCID-NP) (Spitzer, Williams and Gibbon, 1987). Inter-rater reliability was assessed and kappa coefficients for the interview questions were reported as ranging from .66 to 1.00. After the interview, subjects were classified as symptomatic if they met the first two criteria and at least one of the last 3 criteria of the SCID-NP. Once the girls were assigned as either symptomatic or asymptomatic the other measures were compared. The results showed that symptomatic girls had significantly higher BMI values and significantly thicker triceps skinfold measurements than the asymptomatic group. These effects were also seen after controlling for stage of sexual maturation. These results add to the suggestion that individuals who are heavier may also be at risk of developing disordered eating tendencies. However, only one skinfold measurement was used to assess body composition and thus, individuals may have been classified incorrectly. Sums of multiple skinfolds should be used for a more accurate assessment (Marshall, Hazlett, Spady, and Quinney, 1990; Marshall, Hazlett, Spady, Conger and Quinney, 1991).

The only study found to date that has used 5 skinfolds to measure body composition in relation to disordered eating was done by Marshall and Harber (1996). This study examined 111 junior and senior elite female field hockey players to determine the prevalence of disordered eating in this population, whether there were differences between junior and senior players, and finally, whether there was a relationship between disordered eating tendencies and body composition. Anthropometric measures that were taken included height, weight, and 5 skinfolds (triceps, biceps, subscapular, supra iliac and calf). Disordered eating tendencies were measured

using the EDI. The Drive for Thinness and Body Dissatisfaction subscales were used to identify athletes at risk. At risk was defined as scoring >15 on the Drive for Thinness and >17 on the Body Dissatisfaction subscales. These cutoff points were used because they are the 50th percentile scores of clinically diagnosed patients with eating disorders (Garner, et al., 1984). The results of this study showed that subjects who had higher Body Dissatisfaction scores were significantly fatter, heavier and had higher BMI's than those that had lower scores.

The results of all these studies show that individuals with higher BMI's or body composition also had elevated Drive for Thinness and/or Body Dissatisfaction scores. This shows the importance of including body composition measurements when studying disordered eating because they distinguish, relative to body composition, the type of individuals who report high values in the subscales. If individuals are relatively thin and are dissatisfied with their bodies and have a high Drive for Thinness score, then this should be a cause for concern. Also, if fatter individuals who have high scores on these subscales do not get appropriate guidance with regards to weight loss, they may engage in inappropriate behaviours to lose weight. Therefore, body composition measures play an important role in studies on eating disorders and disordered eating tendencies.

These studies show that there is some relationship between stress and eating disorders. They have found that patients with eating disorders and individuals with disordered eating tendencies tend to have more stress in their lives and/or possess a lower stress tolerance. Further research should be done to determine the exact mechanism that may trigger disordered eating behaviour and to determine whether stress plays a significant role in the onset of eating disorders.

Coping and Eating Disorders

With regards to coping some of the literature suggests that individuals with eating disorders use inappropriate coping mechanisms (Troop et al., 1994), and others propose that these individuals use the disordered eating behaviour as a coping mechanism (Pike and Rodin, 1991). Individuals with eating disorders have also been purported to use more inappropriate coping mechanisms, such as avoidance and withdrawal, when faced with stressful situations.

Troop et al. (1994) studied a group of 90 eating disordered patients aged 17 to 45 years, who had been diagnosed with either BN or AN according to DSM-III-R criteria. A non-patient control group of 30 female university students was also used. The subjects were given the Beck Depression Inventory (Beck, Ward, Mendelson, Mock and Erbaugh, 1961) to assess depressive

symptoms. The revised Ways of Coping Checklist (Vitaliano, Russo, Carr, Maioro, and Becker, 1985) was used to assess coping. Eating disorders symptoms were assessed using the Binge Investigatory Test, Edinburgh (BITE) (Henderson and Freeman, 1987) and the Drive for Thinness (DT) and Body Dissatisfaction (BD) subscales of the EDI. No cutoff points for these subscales were given. Also, total EDI scores were used. The results indicated that both AN and BN patients had higher EDI total scores and BD and DT scores than did the controls. This, however, was expected. The authors also found that there were significant differences between the ED patients and the control group of female university undergraduate students in the type of coping mechanisms used. The ED group used more avoidance and wishful thinking strategies, and used less social support than the control group. However, because of the changing nature of coping and the fact that different mechanisms are used in different situations, one cannot assume that these strategies are always maladaptive.

One other factor that may influence coping is not only the type of coping strategy used, but the perception of availability of the strategy and the ability to use that strategy (Lazarus, 1993). Grisset and Norvell (1992) studied a group of women with bulimia to explore their social network and to determine the quality of interactions with this network. Twenty one women who met the DSM-III-R criteria for BN participated in the study, along with 21 women without eating disorders of similar height and weight. Measures used were the Perceived Support Scale, the Quality of Relationships Inventory, the Social Interactions Scale, the Social Competence Questionnaire and the Symptom Checklist-90-R. The authors found that individuals with BN had significant differences in their social networks than controls. These differences included perceiving less social support in their environments and also a higher occurrence of negative interactions and poorer quality of their relationships. This supports the findings by Troop et al. (1994) that individuals with eating disorders use less social support as a coping mechanism. Lacey et al. (1986) also suggested that the patients with BN they studied lacked the necessary coping skills needed to deal with the particular stressors in their lives.

Another possibility is that the eating disordered behaviour may be used as a coping mechanism to deal with the stress. Thus, the individual would be using the associated eating behaviour as an avoidance coping mechanism. This behaviour was seen by Pike & Rodin (1991) who studied the influence of mother's attitudes and behaviours towards eating disorders on the development of eating disorders in their daughters. They found that some of the girls used disordered eating patterns as a coping mechanism to manage feelings of alienation and loneliness

experienced in the family. Disordered eaters, defined by Cattanach et al. (1988) as those subjects who scored three or higher on the Bulimia subscale of the EDI, were found to have a greater desire than controls to binge when exposed to a stressor.

These findings support the role of inappropriate coping in the development of eating disorders. It may be of interest to note that past research indicates that individuals with BN are effected more by stress and use poorer coping mechanisms than individuals with AN (Troop et al. 1994; Cattanach et al. 1988). However, these results may be seen because most of the research has focused on individuals with BN rather than individuals with AN. Therefore, it is important for future research to focus on the effects of coping in all types of eating disorders and disordered eating tendencies, and to determine the specific roles of coping in the onset of eating disorders.

III. METHODS AND PROCEDURES

Design

This was a comparative study that examined the relationships between DET, stress levels and coping strategies in three different groups of females: elite field hockey players (n = 22), elite dancers (n = 11), and a non-elite control group (n = 21). Before this study began, it was reviewed and approved by the Faculty of Physical Education and Recreation Ethics Committee at the University of Alberta. The subjects were briefed and familiarized with the study prior to participation and were also required to sign an informed consent form (Appendix B).

There were not any immediate medical risks to the subjects involved in this study; however, some individuals may have become distressed or upset due to the nature of the study. Because of this, the investigator assembled a team of health care professionals for consultation if required or requested. Following the completion of the questionnaires, the subjects were given information on support groups and professional help in their demographic area if they felt the need to consult someone.

Sampling

The field hockey players were players on the Canadian Women's National Field Hockey squad. This squad was chosen because it included elite athletes from across Canada, and therefore, it was representative of field hockey players across the country. Also, the team was training at the University of Alberta during the course of the study and was readily available. The coach of the team and the Sports Science Committee of Field Hockey Canada were informed about the study and agreed to allow the athletes the opportunity to participate in the study.

The dancers were female volunteers from various elite ballet companies across Canada. Using dancers from different companies across the country controlled for an environmental effect that may have been seen if only one company was used. The dancers were recruited by contacting the artistic director at the company's studio and informing her of the study . The artistic director then informed the dancers of the study and asked for volunteers. The investigator travelled to each of these companies to collect data.

The controls were volunteer female undergraduate students from the University of Alberta campus. Control subjects were required to be regularly active. Regular physical activity was defined as over 20 minutes of exercise at least three times a week (American College of Sports Medicine, 1991). Controls should have been active for at least 6 months. This length of time was suggested because, according to the Transtheoretical model of change, the risk of

relapse back to not exercising decreases substantially after 6 months (DiClemente, Prochaska, Fairhurst, Velicer, Velasquez, and Rossi, 1991). Controls also had to be living away from home.

Subjects were excluded from the study if they were less that 18 years of age because the questionnaires that were used have been validated only in populations above 18 years. Also, if individuals had any mental illness such as clinical depression or schizophrenia, they were excluded because this could have affected their scores on the questionnaires. Subjects in all three groups were also excluded if they were not active, performing or competing due to an injury.

Measures

Measures in this study involved the administration of three questionnaires that assessed eating attitudes and behaviours, stress levels and coping mechanisms. Eating attitudes and behaviours were measured by using the Eating Disorder Inventory (EDI), (Garner et al., 1983); stress levels were measured using the Derogatis Stress Profile (DSP),(Derogatis, 1982); and coping mechanisms were measured using the Ways of Coping Questionnaire (WCQ), (Folkman and Lazarus, 1985). Anthropometric measures of height, weight, and skinfolds were also taken.

Derogatis Stress Profile (DSP)

The DSP is a 77-item questionnaire designed to measure stress. It is a multi-dimensional self-report scale that is based on the interactional stress theory of Lazarus (1966). This theory proposes that stress is comprised of three principal domains: environmental events, personality mediators, and emotional responses, and that it is the interaction of these components that causes varying stress levels. The questionnaire consists of 11 different sub-scales that measure the 3 principal domains. The sub-scales are: 1) Time Pressure, 2) Driven Behaviour, 3) Attitude Posture, 4) Relaxation Potential, 5) Role Definition, 6) Vocational Satisfaction, 7) Domestic Satisfaction, 8) Health Posture, 9) Hostility, 10) Anxiety, and 11) Depression. Three different stress scores can be obtained from the DSP. One is a dimensional measure which assesses the 11 dimensions of the sub-scales. The second is a domain measure which evaluates the three principal domains, and the third is a Total Stress Score (TSS) which gives a measure of global stress. Collectively, these three scores provide a complete assessment of current stress levels (Derogatis, 1987). For purposes of analysis, raw scores and t-scores can be used. Derogatis recommends using raw scores when comparing groups, and t-scores to do individual analysis. The t-scores can be converted to percentile rankings of comparative norms.

Comparative norms have been developed from assessment of students and psychiatric

patients for the age range of 20 to 59 years of age. Internal consistency coefficients for the personality, environmental, and emotional domains have been reported at 0.88, 0.85 and 0.83, respectively. Test-retest reliability coefficients for the TSS have been reported at 0.90 (Derogatis, 1987). The DSP has also been used in previous studies using patients with eating disorders between 15-35 years (Soukup et al., 1990).

Eating Disorder Inventory (EDI)

The EDI is a 64-item standardized multi-scale instrument which was designed by Garner et al. (1983) to assess psychological and behavioural characteristics common to AN and BN. It consists of eight sub-scales: 1) Drive for Thinness, 2) Bulimia, 3) Body Dissatisfaction, 4) Ineffectiveness, 5) Perfectionism, 6) Interpersonal Distrust, 7) Interoceptive Awareness, and 8) Maturity Fears. The first three sub-scales assess attitudes and behaviour regarding eating, weight, and shape, and the last five assess general psychological traits related to eating disorders.

The EDI has been demonstrated to be a reliable and valid measurement of eating attitudes and behaviours (Garner et al., 1983; Norring and Sohlberg, 1988). Internal consistency alpha coefficients have been reported at 0.80. Comparative norms have also been developed from assessment of patients with eating disorders, female college and high school students and male college students. The EDI has also been used in several studies of elite athletes and dancers (Garner et al., 1987; le Grange et al., 1994; Marshall and Harber, 1996; Sungot-Borgen, 1993,1994).

Ways of Coping Questionnaire (WCQ)

The WCQ is a revised version of the Ways of Coping Checklist (WCCL) developed by Folkman and Lazarus (1980). This is a 66-item self-report questionnaire that assesses thoughts and actions used to cope with stressful encounters of every day living. It assesses the broad range of behaviours and cognitive strategies from the original WCCL, but the format has been changed to a 4-point likert scale from a yes-no format. This was done so that respondents can indicate the frequency with which they use the strategy rather than indicating whether they use it or not (Folkman & Lazarus, 1985). In measuring coping processes, eight different coping scales are identified. These are: 1) Confrontive Coping, 2) Distancing, 3) Self-Controlling, 4) Seeking Social Support, 5) Accepting Responsibility, 6) Escape-Avoidance, 7) Planful Problem Solving, and 8) Positive Reappraisal. Two different scores can be calculated when using the WCQ. A raw score can be used to measure the coping effort for each type of coping. A relative score can also be calculated which measures the proportion of effort represented by each coping process.

Validity studies done on the WCQ have shown that this questionnaire effectively measures problem-focused and emotion-focused coping as well as changes in coping strategies across different encounters. Internal consistency alpha coefficients are reported as ranging from 0.61-0.79 for the different coping scales. A version of the WCCL has also been used to measure coping processes in eating disordered patients with ages ranging from 17 to 45 years (Troop et al., 1994).

Anthropometric Measures

Height was measured as the distance from the floor to the vertex with the subject barefoot and standing with heels and back against a wall. The height was recorded to the nearest .5 cm.

Weight was measured with the subject in minimal clothing and shoes removed, to the nearest .1 kg using a beam balance scale.

Skinfolds taken were the triceps, biceps, subscapular, supra iliac, and calf (Canadian Standard Test of Fitness [CSTF], 1986). These were taken with Harpenden skinfold calipers according to the procedures outlined in the CSTF (1986) manual.

Procedure

Each group (ie. field hockey, dance, control) was measured once. An attempt was made to control stress levels by testing the groups at similar stressful times. The dancers were tested on the day of a performance, the field hockey group were tested during a training camp, and the controls were testing during mid-term examination period. The questionnaires were administered in a random order to each individual in order to decrease the likelihood of response bias. For all groups, anthropometric data was collected by the investigator individually at the time that the questionnaires were given. Subjects were called into a separated room to have these measures taken. This required a brief interruption to their completion of the questionnaires.

Data Analyses

To determine the relationship between stress and DET a Pearson product correlation matrix was calculated for the total sample. Multiple *t* tests, using planned comparisons, were used to determine differences in stress and EDI sub-scale scores between the three groups. A Bonferoni correction was used to reduce Type 1 error. Based on this correction, an alpha level of 0.017 was used to determine statistical significance.

The Drive for Thinness and Body Dissatisfaction subscales of the EDI were used to

identify individuals at risk for an eating disorder. The cut-off points of >15 for the DT and >17 for the BD were used. These specific cut-offs were chosen because they indicate scores of the 50th percentile of patients with eating disorder when using the EDI (Garner et al, 1991). Using these cut-off points, the total group was divided. Because of the small number of subjects in some groups, statistical analysis was not done. However, a case study approach was used to discuss individuals deemed to be at high risk.

IV. RESULTS

A. Physical Characteristics of Subjects

The mean scores, standard deviations and ranges of physical characteristics of the subjects are provided in Table 4-1.

Table 4-1 Means of physical characteristics of subjects ($\bar{x} \pm SD$, range).

Variable	Dancers (n = 12) ($\bar{x} \pm SD$, range)	Field Hockey (n = 22) ($\bar{x} \pm SD$, range)	Controls (n = 21) ($\bar{x} \pm SD$, range)
Age(yrs)	21.2 ± 4.2 18-29	23.4± 3.0[a] 18-30	20.4+1.8 18-25
Height(cm)	168.6 ± 0.04 162.5-175.3	165.8± 0.05 158.9-161.2	165.5± 0.07 152.2-177.9
Weight (kg)	54.5 ± 3.5[b] 47.7-59.1	61.8± 5.4 52.4-69.8	59.6± 8.3 41.5-71.5
Sum of Skinfolds (mm)	43.7 ± 8.6[ab] 30.8-55.5	59.6± 15.3 35.2-93.4	62.1± 20.6 28.8-109.5
Body Mass Index	19.2 ± 0.9[ab] 17.45-20.86	22.5± 1.6 19.92-26.21	21.8± 2.8 17.23-27.8

a - significant difference between dance and field hockey
b - significant difference between dance and control
c - significant difference between field hockey and control

The field hockey group was found to be significantly older ($t = 3.89$, $df = 35$, $p < 0.017$) than the control group while there were no significant differences in age between the dance and field hockey group or the dance and control group. No differences in height were found between any of the three groups. The dance group had significantly lower BMI scores ($t = 7.65$, $df = 32$, $p < 0.017$; $t = 3.96$, $df = 26$, $p < 0.017$) and were leaner ($t = 3.8$, $df = 30$, $p < 0.017$; $t = 3.54$, $df = 29$, $p < 0.017$) than both the field hockey and the control group. The dancers were also significantly lighter than the field hockey group ($t = 4.72$, $df = 31$, $p < 0.017$). No significant difference in weight was found between the dance and control group. There were no significant differences in weight, SOS or BMI between the field hockey and control group.

B. Correlation Analysis

Table 4-2 represents the correlations between the Eating Disorder Inventory and DSP scores for the total sample.

Table 4-2 Total Sample: Correlation between Derogatis Stress Profile and Eating Disorder Inventory

	Drive for Thinness	Bulimia	Body Dissatisfaction	Ineffectiveness	Interoceptive Awareness	Interpersonal Distrust	Maturity Fears	Perfectionism	Total EDI
Subscales Time Pressure	-.01	-.01	.08	.01	-.04	-.06	.18	.09	.04
Driven Behaviour	.12	.07	.02	.06	.18	.11	.25	.35	.17
Attitude Posture	.19	.05	.06	-.03	.24	.20	.09	.37	.18
Relaxation Potential	.39	.30	.32	.24	.28	.37	.47*	.32	.43
Role Definition	.43	.39	.54*	.40	.48*	.31	.42	.36	.43
Vocational Satisfaction	.26	.24	.43	.33	.20	.08	.08	.01	.30
Domestic Environment	.33	.38	.36	.28	.35	.43	.51*	.28	.42
Health Posture	.23	.31	.48*	.43	.45*	.29	.32	.21	.45
Hostility	.23	.12	.37	.29	.41	.34	.20	.26	.37
Anxiety	.51*	.40	.52*	.53*	.49*	.29	.53*	.32	.60*
Depression	.61*	.48*	.68*	.74*	.67*	.36	.51*	.28	.73*
Domains Personality Mediators	.32	.22	.29	.18	.35	.28	.44*	.46*	.57*
Environmental Stress	.37	.43	.59*	.48*	.46*	.37	.30	.14	.53*
Emotional Response	.52*	.40	.61*	.65*	.58*	.34	.51*	.32	.66*
Global Measures Subjective Stress	.28	.23	.38	.19	.23	.24	.17	.26	.34
Total Stress	.51	.42	.60*	.53*	.57*	.41	.53*	.41	.66*

* Significant >.001

A significant relationship was seen between the total EDI and the Total Stress Score of the DSP (r = .66). Significant relationships were also seen between the following EDI and DSP subscales. Drive for Thinness (DT) was significantly correlated with Anxiety (r = .51) and Depression (r = .61). Bulimia was related to Depression (r = .48). Body Dissatisfaction was significantly related to Role Definition (r = .54), Health Posture (r = .48), Anxiety (r = .52) and Depression (r = .68). Ineffectiveness was found to be related to Anxiety (r = .53), and Depression (r = .74). Interoceptive Awareness was significantly related to Role Definition (r =

.48), Health Posture (r = .45), Anxiety (r = .49), and Depression (r = .67). Maturity Fears was related to Relaxation Potential (r = .47), Domestic Environment (r = .51), Anxiety (r = .53), and Depression (r = .51).

C. Scores on Questionnaires

I. Derogatis Stress Profile

The mean scores, standard deviations and ranges of the Derogatis Stress Profile (DSP) for the entire group are shown in Table 4-3.

No significant differences were found between the dance and control groups and the dance and field hockey groups on the Derogatis Stress Profile. The controls scored significantly higher than the field hockey group on both the raw ($t = -3.36$, $df = 32$, $p < 0.017$) and the t-scores ($t = -3.33$, $df = 34$, $p < 0.017$) of the vocational environment subscales. No other significant differences were found between the field hockey and control groups.

Table 4-3 Scoring for Derogatis Stress Profile (mean ± SD)

	Dancers (n = 11)		Field Hockey (n = 22)		Control (n = 21)	
	Raw	T-score	Raw	T-score	Raw	T-score
Subscales						
Time Pressure	13.7 ± 4.5	46.4 ± 11.1	15.6± 3.9	50.7± 9.1	15.3± 3.5	50.4± 8.5
Driven Behaviour	9.7 ± 4.5	44.6 ± 10.0	10.1± 4.0	45.2± 9.4	9.8± 4.3	44.1± 10.4
Attitude Posture	6.4 ± 2.9	46.2 ± 8.8	17.3± 3.1	52.1± 9.1	15.6± 2.6	47.7± 7.5
Relaxation Potential	11.7 ± 4.5	45.5 ± 8.6	10.4± 3.2	43.3± 6.1	11.7± 3.7	46.1± 7.2
Role Definition	12.4 ± 3.0	52.5 ± 6.8	10.3± 3.9	47.5± 8.7	11.3± 3.5	50.1± 7.9
Vocational Environment	10.4 ± 3.5	46.5 ± 6.6	9.1± 3.1	44.1± 6.0	13.5± 5.2[a]	52.5± 9.3[a]
Domestic Environment	8.1 ± 3.3	45.4 ± 5.3	7.4± 3.4	44.0± 6.5	10.5± 5.4	50.0± 10.6
Health Environment	7.3 ± 3.9	45.8 ± 9.2	5.0± 2.6	40.0± 6.7	4.5± 2.6	38.9± 7.3
Hostility	10.6 ± 5.5	48.9 ± 11.0	9.5± 4.9	46.5± 10.0	10.2± 4.2	48.8± 8.1
Anxiety	18.6 ± 6.7	56.8 ± 12.4	14.6± 5.4	49.2± 9.3	16.8± 5.8	53.3± 9.9
Depression	12.9 ± 5.7	60.1 ± 12.0	7.9± 3.1	50.6± 7.3	9.8± 4.4	55.3± 8.8
Domains						
Personality Mediators	235.1 ± 31.0	42.9 ± 8.6	238.7±25.8	43.9± 7.0	237.3± 25.4	44.0± 6.9
Environmental Events	137.7 ± 18.3	42.6 ± 7.8	128.1± 14.6	38.7± 6.4	141.0± 17.0	44.1 ± 7.1
Emotional Response	165.8 ± 32.9	56.5 ± 13.9	146.2± 23.5	48.3± 10.1	155.6± 20.2	52.2 ± 8.7
Global Measures						
Subjective Stress	34.5 ± 29.7	39.2 ± 13.9	49.5± 23.7	48.3± 11.8	48.2± 26.2	46.2 ± 11.5
Totals Stress Score	538.6 ± 77.7	45.3 ± 12.5	513.0± 53.4	41.6± 8.9	533.9± 43.7	45.2 ± 6.1

a - significant difference between dance and field hockey
b - significant difference between dance and control
c - significant difference between field hockey and control

ii. Eating Disorder Inventory Scores

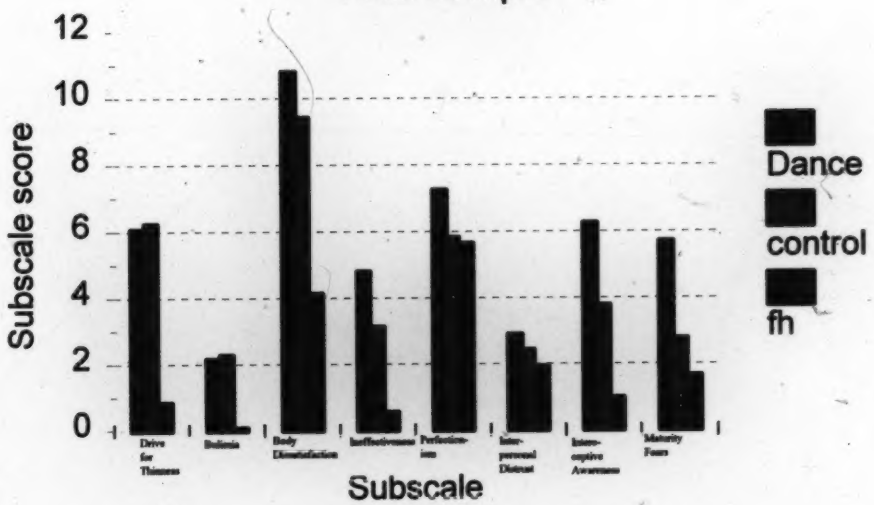
Table 4-4 displays contains the mean scores, standard deviations and ranges of the total EDI and the subscales for all groups. The data is displayed in Figure 1.

Table 4-4 Scores for Eating Disorder Inventory subscales and total (mean ± SD, range).

Subsale	Dancers (n = 11) ($\bar{x}$ ± SD, range)	Field Hockey (n = 22) ($\bar{x}$ ± SD, range)	Controls (n = 21) ($\bar{x}$ ± SD, range)
Drive for Thinness	6.1 ± 7.2 0-21	0.8± 1.5[a] 0-5	6.0± 6.4 0-18
Bulimia	2.2 ± 4.8 0-16	0.1± 0.3 0-1	2.2± 3.8 0-13
Body Dissatisfaction	10.8 ± 9.1 1-27	4.0± 3.8[a] 0-12	9.2± 7.2 0-24
Ineffectiveness	4.8 ± 5.8 0-18	0.5± 0.9 0-3	3.0± 4.4 0-19
Perfectionism	7.3 ± 4.8 0-15	5.6± 3.9 0-15	5.6± 3.9 0-11
Interpersonal Distrust	2.9 ± 3.1 0-9	1.9± 2.3 0-9	2.3± 3.1 0-10
Interoceptive Awareness	6.3 ± 8.0 0-26	1.0± 1.3[c] 0-4	3.6± 3.3 0-11
Maturity Fears	5.7 ± 4.3 0-12	1.6± 1.6 0-6	2.7± 3.1 0-11
Total	46.1 ± 41.5 4-142	15.5± 8.7[a] 4-33	34.6± 24.6 3-73

a - significant difference between dance and field hockey
b - significant difference between dance and control
c - significant difference between field hockey and control

Figure 4.1: EDI Scores
Total Sample



The control group scored significantly higher than the field hockey group on the Drive for Thinness ($t = -3.57$, $df = 22$, $p < 0.017$), Body Dissatisfaction ($t = -2.93$, $df = 30$, $p < 0.017$), and Interoceptive Awareness ($t = -3.46$, $df = 26$, $p < 0.017$) subscales, and also on the total EDI score ($t = -3.36$, $df = 25$, $p < 0.017$). No other significant differences between the field hockey and control groups were noted. No significant differences were found between the dance and field hockey groups or the dance and control group.

Although significant differences were not found in all of the EDI subscales between groups, the dancers and controls had a tendency to score higher than the field hockey group on all subscales (Figure 1).

iii. Ways of Coping Questionnaire

The means and standard deviations of the Ways of Coping Questionnaire subscales are reported in Table 4-5.

Table 4-5 Scoring for the Ways of Coping Questionnaire (mean ± SD).

	Dancers (n = 11)		Field Hockey (n = 22)		Controls (n = 21)	
Subscale	Raw	Relative(%)	Raw	Relative(%)	Raw	Relative(%)
Confrontive Coping	6.0 ± 3.7	8.3 ± 3.7	4.6 ± 3.1	7.7 ± 3.8[a]	7.0 ± 3.3	12.0 ± 4.2
Distancing	8.4 ± 4.2	12.0 ± 5.9	6.6 ± 3.0	12.3 ± 5.5	6.8 ± 3.4	11.6 ± 5.3
Self-Controlling	11.7 ± 3.8	14.4 ± 2.2	8.8 ± 4.1	13.5 ± 5.0	9.4 ± 3.5	14.2 ± 4.3
Seeking Social Support	11.1 ± 2.5	17.2 ± 6.4	9.8 ± 4.2	18.0 ± 7.7	8.3 ± 3.9	15.0 ± 7.6
Accepting Responsibility	5.3 ± 4.1	10.8 ± 7.2	4.1 ± 2.4	11.0 ± 5.4	4.8 ± 3.1	11.9 ± 5.2
Escape-Avoidance	11.1 ± 4.5	11.2 ± 6.9	7.2 ± 3.6	9.9 ± 4.7	7.6 ± 4.8	9.2 ± 4.4
Planful Problem Solving	9.2 ± 4.0	14.0 ± 5.8	9.2 ± 4.0	16.9 ± 7.1	8.6 ± 3.7	14.7 ± 5.7
Positive Reappraisal	8.5 ± 5.1	12.3 ± 7.8	7.0 ± 3.7	10.6 ± 4.5	7.7 ± 4.0	11.3 ± 5.0

a - significant difference between dance and field hockey
b - significant difference between dance and control
c - significant difference between field hockey and control

Significant differences were found between the field hockey and the control group with the controls having significantly higher relative confrontive coping scores ($t = -3.54$, $df = 41$, $p < 0.016$). There were no further significant differences between field hockey and control groups. No significant differences were found between the dance group and field

I. Physical characteristics of individuals with high vs low Drive for Thinness and Body Dissatisfaction.

Table 4-6 reports the physical characteristics of the total sample when they are divided into high and low risk categories using the DT and BD subscales of the EDI.

Table 4-6 Total Sample: Physical characteristics of subjects (mean ± SD).

Variable	DT ≤ 15 (n = 50)	DT > 15 (n = 4)	BD ≤ 17 (n = 48)	BD > 17 (n = 6)
Age(yrs)	21.9 ± 3.2	19.8 ± 0.5	22.0 ± 3.2	20.0 ± 2.1
Height(cm)	165.9 ± 0.1	169.8 ± 0.1	166.4 ± 0.1	164.4 ± 0.1
Weight (kg)	59.5 ± 7.1	58.6 ± 3.9	59.8 ± 6.6	56.8 ± 9.6
Sum of Skinfolds (mm)	58.2 ± 18.0	50.8 ± 13.6	57.3 ± 16.8	60.2 ± 26.2
Body Mass Index	21.6 ± 2.4	20.3 ± 1.4	21.6 ± 2.4	20.9 ± 2.7

Table 4-7 contains the physical characteristics of the high risk individuals.

Table 4-7 Physical characteristics of high risk individuals.*

Subject	Age	Height (cm)	Weight (kg)	BMI (Kg/m ^{2})	SOS (mm)
Dancer 1 (DT=21,BD=27)	20	172.1	56.8	19.18	42.9
Dancer 2 (DT=5, BD=19)	18	165.0	56.8	20.86	54.7
Dancer 3 (DT=17,BD=22)	19	166.3	54.5	19.71	36.3
Control 1 (DT=8,BD=21)	19	152.2	41.5	17.92	51.9
Control 2 (DT=17,BD=13)	20	177.9	63.5	20.06	58.1
Control 3 (DT=12,BD=24)	20	168.0	71.5	25.33	109.5
Control 4 (DT=18,BD=23)	20	162.9	59.5	22.42	65.8

* cut-off points to identify high risk: DT>15; BD> 17

ii. DSP scores of individuals with high vs low DT and BD.

The means of the DSP subscales of individuals with high and low BD and DT scores are reported in Table 4-8, and these t-scores and percentiles for high risk individuals are reported in Table 4-9. T-scores and not raw scores are reported because Derogatis (1984) recommends using the t-score for individual analysis in order to compare the scores to standardized norms.

Table 4-8 Total Sample: Scoring for Derogatis Stress Profile.

	DT ≤ 15 (n = 50)		DT > 15 (n = 4)		BD ≤ 17 (n = 48)		BD > 17 (n = 6)	
	Raw	T-score	Raw	T-score	Raw	T-score	Raw	T-score
Subscales								
Time Pressure	15.1 ± 3.8	49.7 ± 9.2	14.5 ± 5.2	48.3 ± 4.8	14.9 ± 3.8	49.1 ± 9.1	16.5 ± 4.5	53.0 ± 10.7
Driven Behaviour	9.8 ± 4.2	44.8 ± 9.9	10.5 ± 4.2	46.0 ± 9.2	10.0 ± 4.0	45.2 ± 9.4	9.0 ± 5.2	42.3 ± 12.9
Attitude Posture	16.0 ± 3.0	48.3 ± 8.9	18.8 ± 1.3	56.5 ± 3.3	16.3 ± 2.9	49.0 ± 8.7	16.0 ± 3.6	48.5 ± 10.6
Relaxation Potential	10.8 ± 3.5	44.0 ± 6.9	15.3 ± 2.8	52.0 ± 5.0	11.0 ± 3.2	44.5 ± 6.1	12.2 ± 6.7	45.5 ± 13.4
Role Definition	10.9 ± 3.5	48.9 ± 7.9	13.8 ± 3.6	55.5 ± 7.9	10.7 ± 3.4	48.5 ± 7.6	14.2 ± 3.9	56.5 ± 8.5
Vocational Environment	10.9 ± 4.5	47.4 ± 8.3	13.5 ± 3.4	52.3 ± 5.9	10.6 ± 4.2	46.8 ± 7.8	15.2 ± 5.2	54.8 ± 9.1
Domestic Environment	8.6 ± 4.5	46.6 ± 8.7	10.3 ± 3.9	48.8 ± 5.9	8.5 ± 4.6	46.4 ± 8.8	10.5 ± 3.1	49.5 ± 4.8
Health Environment	5.0 ± 2.6	40.1 ± 7.0	8.0 ± 6.2	47.3 ± 14.5	4.9 ± 2.6	39.7 ± 7.0	8.0 ± 4.7	47.8 ± 10.8
Hostility	9.7 ± 4.5	47.0 ± 9.0	14.0 ± 6.6	55.5 ± 12.6	9.5 ± 4.4	46.6 ± 8.8	14.2 ± 5.6	55.8 ± 10.6
Anxiety	15.8 ± 5.9	51.3 ± 10.4	22.3 ± 2.6	62.8 ± 5.7	15.5 ± 5.8	50.8 ± 10.3	22.5 ± 2.1	63.2 ± 4.5
Depression	9.1 ± 4.2	53.0 ± 8.8	16.0 ± 5.3	67.0 ± 10.2	8.8 ± 3.7	52.3 ± 8.0	16.8 ± 4.7	68.2 ± 9.3
Domains								
Personality Mediator	235.8 ± 26.2	43.1 ± 7.2	258.3 ± 18.2	49.3 ± 4.8	236.4 ± 24.9	43.3 ± 6.8	245.8 ± 37.1	45.8 ± 10.1
Environmental Events	134.0 ± 16.2	41.2 ± 6.9	148.3 ± 24.6	47.3 ± 10.4	132.9 ± 15.6	40.7 ± 6.6	152.2 ± 20.2	48.8 ± 8.5
Emotional Response	151.3 ± 23.6	50.5 ± 10.1	185.3 ± 26.3	64.3 ± 11.0	149.7 ± 22.6	49.8 ± 9.7	187.2 ± 20.4	65.5 ± 8.6
Global Measures								
Subjective Stress	45.2 ± 26.9	45.4 ± 12.8	55.3 ± 10.0	48.0 ± 4.8	43.9 ± 26.8	44.9 ± 12.8	61.8 ± 13.0	51.2 ± 6.5
Totals Stress Score	521.1 ± 52.1	43.0 ± 8.4	591.8 ± 67.2	53.5 ± 9.6	519.0 ± 50.8	42.7 ± 8.3	585.2 ± 63.9	52.3 ± 9.0

Table 4-9 DSP t-scores and percentiles for high risk individuals (t, percentile)

Subject	Time Pressure	Driven Behaviour	Attitude Posture	Relaxation Potential	Role Definition	Vocational Environment	Domestic Environment	Health Environment	Hostility	Anxiety	Depression	Subjective Stress Score	Total Stress Score
Dancer 1 (DT=21,BD=27)	40 (16)	58 (82)	60 (84)	55 (70)	67 (95)	60 (84)	55 (70)	68 (96)	63 (93)	71 (98)	80 (99+)	45 (30)	66 (94)
Dancer 2 (DT=5, BD=19)	60 (88)	39 (15)	42 (20)	30 (2)	47 (33)	40 (16)	42 (20)	46 (31)	40 (16)	58 (80)	62 (88)	51 (51)	41 (17)
Dancer 3 (DT=17,BD=22)	66 (94)	36 (8)	52 (58)	57 (72)	54 (68)	50 (50)	52 (53)	46 (32)	69 (97)	62 (86)	68 (97)	53 (65)	56 (72)
Control 1 (DT=8,BD=21)	56 (72)	55 (70)	49 (49)	57 (78)	67 (94)	61 (85)	49 (49)	46 (33)	61 (85)	64 (92)	59 (83)	61 (85)	57 (78)
Control 2 (DT=17,BD=13)	47 (32)	47 (32)	57 (80)	50 (50)	49 (49)	46 (33)	42 (18)	40 (16)	42 (20)	58 (82)	58 (82)	51 (52)	46 (33)
Control 3 (DT=12,BD=24)	56 (72)	30 (2)	31 (3)	30 (2)	52 (53)	65 (93)	53 (65)	46 (33)	54 (68)	64 (92)	78 (99)	54 (68)	48 (42)
Control 4 (DT=18,BD=23)	40 (16)	43 (25)	57 (80)	46 (33)	52 (58)	53 (65)	46 (33)	35 (7)	48 (48)	60 (84)	61 (85)	43 (20)	46 (33)

iii. EDI scores of individuals with high vs low DT and BD.

The EDI subscale scores for high and low risk individuals are reported in Table 4-10. Table 4-11 contains the EDI scores and percentiles for each high risk individual.

Table 4-10 Total Sample: Scoring for EDI

Subscale	DT ≤ 15 (n = 50)	DT > 15 (n = 4)	BD ≤ 17 (n = 48)	BD> 17 (n = 6)
Drive for Thinness	2.7 ± 4.1	18.3 ± 1.9	2.7 ± 4.4	13.5 ± 6.2
Bulimia	0.9 ± 2.6	6.5 ± 6.6	0.9 ± 2.5	5.2 ± 5.9
Body Dissatisfaction	6.3 ± 5.9	21.3 ± 5.9	5.5 ± 4.6	22.7 ± 2.7
Ineffectiveness	1.7 ± 3.3	10.5 ± 5.2	1.4 ± 2.2	9.8 ± 7.5
Perfectionism	5.6 ± 3.9	10.3 ± 5.1	5.4 ± 3.8	10.5 ± 4.0
Interpersonal Distrust	2.2 ± 2.7	3.5 ± 4.0	2.2 ± 2.7	2.8 ± 3.8
Interoceptive Awareness	2.3 ± 3.0	13.0 ± 9.0	2.1 ± 2.8	11.2 ± 7.8
Maturity Fears	2.6 ± 3.1	6.0 ± 4.6	2.4 ± 2.8	6.7 ± 4.2
Total	24.4 ± 19.5	89.3 ± 39.1	22.5 ± 17.7	82.3 ± 31.9

Table 4-11 EDI scores and percentiles for high risk individuals (score, percentile)

Subject	Drive for Thinness	Bulimia	Body Dissatisfaction	Ineffectiveness	Perfectionism	Interpersonal Distrust	Interoceptive Awareness	Maturity Fears	Total
Dancer 1	21 (88+)	16 (53)	27 (84)	18 (81)	15 (89)	9 (77)	26 (98)	10 (89)	142
Dancer 2	5 (9)	0 (3)	19 (56)	0 (5)	11 (67)	2 (32)	11 (58)	5 (71)	53
Dancer 3	17 (61)	5 (21)	22 (67)	10 (50)	12 (74)	4 (47)	12 (62)	10 (89)	92
Control 1	8 (17)	0 (3)	21 (64)	5 (29)	11 (67)	2 (32)	5 (25)	11 (91)	63
Control 2	17 (61)	1 (5)	13 (37)	7 (38)	3 (17)	1 (23)	6 (29)	2 (28)	50
Control 3	12 (30)	6 (27)	24 (75)	19 (83)	3 (17)	0 (13)	5 (25)	2 (28)	71
Control 4	18 (73)	4 (15)	23 (70)	7 (38)	11 (67)	0 (13)	8 (41)	2 (28)	73

iv. WCQ of individuals with high vs low DT and BD.

The mean scores of the WCQ for those classified as high and low risk on DT and BD are shown in table 4-12. Table 4-13 contains the relative scores of the WCQ for each high risk individual. Only the relative scores are reported for individuals because relative scores are more beneficial when comparing individual subjects (Lazarus and Folkman, 1985).

Table 4-12 Total Sample: Scoring on the Ways of Coping Questionnaire

	DT ≤ 15 (n = 50)		DT > 15 (n = 4)		BD ≤ 17 (n = 48)		BD > 17 (n = 6)	
Subscale	Raw	Relative(%)	Raw	Relative(%)	Raw	Relative(%)	Raw	Relative(%)
Confrontive Coping	5.6 ± 3.3	9.5 ± 4.5	8.0 ± 4.7	10.0 ± 2.9	5.4 ± 3.1	9.3 ± 4.3	8.7 ± 5.6	11.2 ± 5.0
Distancing	6.9 ± 3.4	12.0 ± 5.6	8.8 ± 4.2	11.3 ± 3.1	6.8 ± 3.3	11.9 ± 5.5	9.3 ± 4.1	12.3 ± 5.0
Self-Controlling	9.3 ± 3.7	13.8 ± 4.3	13.8 ± 4.0	15.5 ± 3.7	9.5 ± 3.9	14.1 ± 4.4	11.2 ± 4.1	12.5 ± 2.9
Seeking Social Support	9.3 ± 4.0	16.7 ± 7.6	11.8 ± 0.5	16.3 ± 4.8	9.3 ± 4.0	16.9 ± 7.7	10.8 ± 2.5	14.8 ± 4.7
Accepting Responsibility	4.5 ± 3.0	11.0 ± 5.8	6.8 ± 3.1	15.0 ± 0.8	4.5 ± 3.0	11.2 ± 5.9	5.5 ± 2.8	12.0 ± 3.5
Escape-Avoidance	8.0 ± 4.6	10.1 ± 5.1	10.5 ± 7.0	7.5 ± 3.4	7.5 ± 4.4	9.6 ± 5.1	13.7 ± 4.2	12.3 ± 4.2
Planful Problem Solving	9.0 ± 3.7	15.8 ± 6.4	8.5 ± 5.3	11.3 ± 3.0	8.9 ± 3.8	15.8 ± 6.5	9.3 ± 4.5	12.5 ± 3.6
Positive Reappraisal	7.6 ± 4.0	11.0 ± 4.9	8.0 ± 5.0	13.8 ± 10.9	7.6 ± 4.1	11.1 ± 4.9	7.8 ± 4.2	12.2 ± 9.0

Table 4-13 Relative Scores of WCQ for high risk individuals.

Subject	Confrontive Coping	Distancing	Self-Controlling	Seeking Social Support	Accepting Responsibility	Escape-Avoidance	Planful Problem Solving	Positive Reappraisal
Dancer 1 (DT=21,BD=27)	7	7	14	14	14	7	7	29
Dancer 2 (DT=5, BD=19)	4	21	16	9	11	16	10	13
Dancer 3 (DT=17,BD=22)	13	13	13	11	15	11	14	11
Control 1 (DT=8,BD=21)	18	8	8	15	11	13	15	11
Control 2 (DT=17,BD=13)	8	11	21	18	16	3	12	12
Control 3 (DT=12,BD=24)	13	11	10	18	6	18	17	6
Control 4 (DT=18,BD=23)	12	14	14	22	15	9	12	3

V. DISCUSSION

Physical Characteristics

The dancers were found to be leaner than both the field hockey players and controls and lighter than the field hockey group. Ballet dancers must be light and lean in order to comply with the ballet world standards and to be a part of an elite company (Hamilton et al., 1986). When comparing dancers to other groups of athletes in non-lean emphasized sports, dancers generally tend to be much lighter than the other groups (Holderness et al., 1994). Also, the range for weight, sum of skinfolds (SOS) and Body Mass Index (BMI) was greater (52.4-69.8 kg; 35.2-93.4 mm; 19.9-26.2 kg/m^2 respectively) for the field hockey players than for the dancers (47.4-59.1 kg; 30.8-55.5 mm; 17.5-20.8 kg/m^2 respectively). This suggests that whereas dancers must comply with a specific body type, field hockey is open to a variety of body types and sizes (Marshall and Harber, 1996). The control group had a very large range in weight, BMI, and SOS (41.5-71.5 kg; 17.23-27.8 kg/m^2; 28.8-109.5 mm, respectively). This suggests that a wide variety of body types and sizes are involved in recreational activities. This wide range may also explain why there were no significant differences in weight between the dance group and controls. The control group was also significantly younger than the field hockey group. The undergraduate course where the control subjects were recruited was a first year course, whereas, most of the players on the national field hockey team are near the end or have completed their university degrees.

Relationship between Stress and Eating Attitudes and Behaviours

Several significant relationships were found between subscales of the Eating Disorder Inventory (EDI) and the Derogatis Stress Profile (DSP). Of interest, there was a positive statistically significant relationship between the total EDI and the Total Stress Score of the DSP ($r = .66$), thus supporting a relationship between the amount of stress a person experiences and negative eating attitudes and behaviours (Soukup et al., 1990). This positive relationship also supports the first hypothesis that there would be a positive relationship between stress and negative eating attitudes and behaviours.

The Emotional Response, Environmental Events, and Personality Mediators domains and the Total Stress Score are calculated by adding the subscales scores and therefore give a broad sense of an individual's stress. The subscales measure specific traits and describe specific events that can increase stress. Because of this, only the relationships between EDI subscales and DSP subscales will be discussed. With regards to the subscales in each questionnaire, 17 of

88 (19.3%) correlations were found to be statistically significant.

Significant relationships were seen between the Drive for Thinness (DT), Body Dissatisfaction (BD), Interoceptive Awareness (IA), and Maturity Fears (MF) subscales of the EDI and the Anxiety and Depression subscales of the DSP. Several other significant relationships were also noted.

The correlation between DT and Anxiety was r = .51. The Anxiety subscale tries to measure low to middle ranges of clinical anxiety. This includes measures of tension, worry, nervousness and other traits that are typical of imminent anxiety (Derogatis, 1987). The correlation between this subscale and the DT of the EDI may suggest that preoccupation with weight, concern for dieting and fear of weight gain may lead an individual to have increased symptoms of anxiety. A preoccupation with weight gain is a criteria for AN and BN (American Psychiatric Association, 1994). Patients with eating disorders have also reported higher scores on the anxiety subscale of the EDI (Soukup et al., 1990). This greater anxiety may also result in a higher dissatisfaction with one's body and shape which may explain the relationship between the anxiety subscale and BD (r = .52).

Anxiety was also significantly related to IA (r = .49) and MF (r = .53). An increased score in IA indicates a greater confusion and apprehension in recognizing feelings and emotions. This in turn, may increase levels of anxiety and thus the positive relationship with the IA subscale of the EDI. The MF subscale assesses a desire to retreat back to childhood which is associated with a fear of adult weight gain. Because of this fear, there may be increased anxiety.

A significant relationship was also found between Anxiety and the Ineffectiveness subscale of the EDI (r = .53). Ineffectiveness assesses feelings of inadequacy, emptiness and lack of control of life. It is also related to poor self-esteem and includes feelings of emptiness and aloneness (Garner, 1995). Therefore, a high score on this subscale indicates a low self-esteem, feelings of inadequacy and lack of control. These feelings can cause an increased level of nervousness, worry and tension which would lead to a higher level of anxiety, thus the high correlation between the two subscales.

The Depression subscale of the DSP was also related to many of the EDI subscales. Significant relationships were seen with the DT (r = .61), Bulimia (r = .48), BD (r = .68), Ineffectiveness (r=.74), IA (r = .67), and the MF (r = .51) subscales of the EDI. The Depression subscale assesses various manifestations of depression such as loneliness, hopelessness, self-depreciation and lowered self-esteem. Because low self esteem is seen in many individuals with

eating disorders (Cattanach et al, 1988; Lindeman, 1994), the high correlation between this subscale and the EDI subscale scores is not surprising. A high DT score indicates that the individual has a high fear of weight gain, preoccupation with weight and is excessively concerned with dieting (Garner, 1995). If an individual fears weight gain or is afraid they cannot lose weight, they may have greater feelings of hopelessness and self-depreciation. This may also explain the correlation between depression and the DT subscale.

The relationship between depression and the BD subscale suggests that a higher level of BD may lead to higher levels of self-deprecation, lowered self-esteem and ultimately higher levels of depression. The Depression subscale was highly correlated to the Ineffectiveness subscale of the EDI (r=.74). Given that the ineffectiveness subscale measures traits very similar to that of the depression subscale (worthlessness, emptiness, insecurity and low self-esteem), the high correlation is not surprising. This high correlation also adds to the construct validity of the two scales because they should assess similar traits.

The Bulimia subscale of the EDI may be related to the depression subscale of the DSP because a tendency towards bulimic behaviours may lead an individual to feel badly about one's self. Also, depression symptoms have been associated with BN (Cooper, 1995; Cooper, 1995; Garfinkel, 1995).

The IA subscale was also highly correlated to the Depression subscale. Interoceptive awareness measures confusion and apprehension in recognising and responding to emotional states and feelings. A higher score in this may also mean that a lack of dealing with one's feelings may lead to higher levels of depression. The relationship between Depression and MF may be explained by the fact that an individual with a high MF score has a strong desire to stay young and a great fear of aging. The realization that aging is inevitable may cause feelings of hopelessness resulting in a higher level of depression.

Other significant relationships between the EDI and DSP subscales were also seen. BD was also significantly related to the Role Definition (RD) (r = .54) and Health Posture (HP) (r = .48) subscales of the DSP. RD 'refers to a form of self definition which is the consistent representation of self an individual makes, both privately to himself and publicly to others' (Derogatis, 1995, p. 5). There are some role definitions that can be highly stress inducing. For example, if body image and outward appearance is important in an individual's definition of self, and that individual is highly dissatisfied with her body, she may define herself as worthless and weak. This can in turn increase the stress of the individual. Distorted body image has been

found in many individuals that have DET and is a criteria for anorexia nervosa (AN) (Sunday et al., 1992; Thompson and Heinberg, 1993). This may explain an elevated score in role definition for those who score high on the BD subscale of the EDI.

The Health Posture (HP) subscale assesses an individual's level of stress by measuring activities and habits that can affect health. Derogatis (1995) assumes that if an individual engages in habits that effect health in a negative way such as smoking, drinking and a sedentary lifestyle it can increase levels of stress. This will lead to an elevated HP score. A high BD score may mean that the individual is not satisfied with their body and that they may engage in certain unhealthy behaviours to lose weight or alter body composition. This may explain the relationship between HP and BD.

Other DSP subscales that were related to IA of the EDI were the RD ($r = .48$) and HP subscales ($r = .45$). IA measures confusion and apprehension in recognising and responding to emotional states and feelings. This confusion and apprehension may again lead individuals to appraise themselves as worthless; therefore, leading to an elevated RD score on the DSP. The relationship between IA and HP was somewhat difficult to interpret and understand. It may be that an individual who has difficulty responding to and dealing with emotional states and feelings may engage in behaviours that effect health negatively. This may in turn increase the stress level of the individual.

Maturity Fears was also related to the Relaxation Potential (RP) ($r = .47$) and the Domestic Environment (DE)($r = .51$) subscales of the DSP. RP measures the ability to find healthy diversions from daily routines and daily hassles. Individuals who have these diversions tend to cope with stress better because they have a healthy resource to help them deal with stress. These activities can act as stress deflectors (Derogatis, 1995). Those that do not have these healthy diversions may not be able to endure higher levels of stress. An elevated score in this subscale indicates a lack of relaxation resources and a higher level of stress. The MF subscale of the EDI assesses one's desire to retreat back to childhood and its security. An individual with a higher score may feel younger than she is and may be less mature than her peers. Individuals that score higher on the MF subscale may not have the maturity or the insight to develop healthy resources to deal with stress and this may increase the level of stress. This may explain the relationship between RP and MF.

The DE subscale assesses one's satisfaction with one's immediate and extended family. This environment can be either very stress inducing or it can be essential in reducing stress,

depending on the nature of the environment. An elevated score in this scale may indicate that the domestic environment is creating stress for an individual. An individual with a high MF score may have a stressful domestic environment because those around them may want them to act more mature and deal with daily problems in a more adult fashion. If this individual has a strong fear of maturity and aging, then the environment may become very stressful. The fear of maturity is also associated with the weight that is gained after puberty. If the domestic environment is one that pressures an individual to be thin, this may also increase the individual's stress level.

Summary of Correlation Section

In the total sample several relationships were seen between DSP scores and EDI scores indicating that there was a relationship between stress and negative eating attitudes and behaviour. The most significant correlations among all groups were ones associated with the Emotional Response domain. This may suggest that it is how one deals with emotions and feelings that may influence eating behaviour. This also corresponds to the results found when comparing high risk with low risk individuals.

Derogatis Stress Profile

To compare the three groups, only the raw scores of the DSP were used. Derogatis (1995) recommends using the raw scores when making comparisons between groups and using t-scores for individual analyses. Contrary to the initial hypothesis made, there were no differences in stress scores between the dancers and the field hockey players. This was surprising because it was hypothesized that the dancers would be subjected to an added environmental stress to be thin for their performance. It is possible that the DSP, although a good measure of current stress levels, may not be appropriate for determining the type of stress that a dancer encounters in the dance environment. In fact, the questions that relate to the environmental stress domain include questions about competition and wanting to do better than others, but there are no questions that deal with appearance and pressure to conform to cultural standards. Future studies could use a modified version of the DSP that includes these questions. Also, because there were fewer dancers tested, significance may not have been reached.

It could also be argued for both groups that being involved in a regimented and tight knit group, such as a team or a company, may have a beneficial effect and help individuals reduce stress. This may be true because both groups have a strong support system in their team or company. A strong social network has been reported as a very effective coping resource

(Grissett and Norvell, 1992). However, as has been reported by several researchers, in the dance community, the same individuals that are seen as a social support group and that help a dancer deal with stress are also the ones that are in direct competition with that dancer (Bauer, 1990; Hamilton et al, 1989; Hanna, 1990). This direct competition within the support group may also be seen in the field hockey player. Because of this, it would be beneficial for the dancers and field hockey players to have an external social support group. However, because most of the dancers have left home at a very early age and have very little contact with their families this separate social network may not be available to them (Hamilton et al., 1989). This may add to the stress of the dancer. However, because the DSP does not have questions that refer to this type of stressor, it may not have been assessed.

The control subjects scored significantly higher than the field hockey players on the Vocational Environment subscale. This subscale reflects satisfaction with one's vocation and a sense of well being due to one's job. An elevated score indicates a higher dissatisfaction with a job which results in a higher level of stress (Derogatis, 1995). Because the controls were still in school, they may be at a period where they are not satisfied with their vocation. They may be confused about their future and not know what lies ahead in their life. They may also be involved in part time jobs to supplement their tuition that they are not happy with. Contrarily, the field hockey players are currently involved in a sport that they have played for many years, and for many of them, having this as their vocation is a dream come true. The significantly younger age of the controls may also affect the levels of stress due to their vocational environment. It may be that at a younger age, these individuals may not have the maturity and experience to deal with the lack of security that a steady job and income provides. There were no other significant differences found between these two groups.

There were no differences found between the dancers and the control group in the DSP. This may be attributed to the same reasons that there were no differences between EDI scores as well. The controls may feel the same societal pressures to be thin that the dancers feel from their profession. It could also mean that instead of the elite groups having higher stress, being involved in a regimented activity and being part of a team or company may be a buffer to increased stress (Grisset and Norvell, 1992).

In addition, the majority of the subjects in the control group were students from a heath education class that taught behaviour change techniques and focused on health behaviours. One of the topics discussed in the class was stress and stress management. It is possible that the

individuals in this class had higher levels of stress to begin with and were taking this class to learn how to handle their stress better. Hence, it is possible that this group may not have been representative of a true control.

Eating Disorder Inventory

Contrary to the initial hypothesis, there were no significant differences found on any of the subscales of the EDI when comparing the field hockey and dance group. This may be attributed to the low number of dancers and possibly to the very high variability in the EDI scores. In fact, for some subscales in the dance population, the standard deviation was larger than the mean. The wide range and high variability may also indicate that individuals from two extremes may have been tested. An individual with fairly healthy eating attitudes and behaviours may have had very low scores, and an individual with unhealthy eating attitudes and behaviours may have had very high scores and therefore the range would be very large and the standard deviation would also be large. Because the two extremes may have been tested, the mean scores may be a true indicator of the scores of the entire group. This may have affected significance.

It may also be an indication that the specific dancers that were tested have healthier and more positive attitudes towards eating and weight loss. Because volunteers were used, the dancers that volunteered may be ones that do not have a problem with eating behaviour. This may also explain the low numbers of dancers that were used. From 4 companies that were asked to participate in this study, only 11 dancers agreed to participate. Therefore, although the results show that eating attitudes and behaviours did not differ significantly between the two elite groups, it may not be a proper indication of the extent of eating problems in the elite dance community. In fact the recent death of Boston ballet dancer Heidi Geunther from complications due to AN (Ryan, 1997) indicates that there is still a great problem in the dance community that needs to be examined.

The low numbers of dancers may also be reflective of one problem in doing research in this area which is the difficulty in recruiting dance subjects for research. In fact, a literature search done on eating disorders or DET in a professional dance population produced only 20 articles between 1970 and 1997. Of these articles, only 6 were written between 1990 and 1997. This information combined with the difficulty to obtain subjects for this study indicates that there may be reluctance in the dance community to have research done on eating disorders and DET. This must be addressed in further research in this area.

Although significance was not reached, the average scores of the dancers were higher than the scores of the field hockey players in all subscales (Figure 1). Also, the range of scores for the dancers was larger than that of the field hockey group. For example, the DT and BD scores for field hockey ranged from 0-5 and 0-12 respectively. The range for the same subscales in the dance group was 0-21 and 1-27. This shows that certain dancers were scoring higher than the field hockey players on the EDI. Not only is this problematic because of the scores on the sub-scales, but the dancers were significantly leaner and lighter. A high score on the DT subscale indicates a desire to be thin. However, the individuals who indicated this desire were already very thin and lean. In fact, the dancers that scored above the cut-off points for DT (2/11 = 18.2%) and BD (3/11 = 27.3%) had an average BMI of 19.4 and 19.9 and an average SOS of 39.6 and 44.6, respectively. In the field hockey group, only one individual had a lower BMI score and only 3 had lower SOS yet no subjects in the field hockey group scored above the DT and BD cut-off points.

Higher DT and higher BD scores coupled with low weight and leanness in certain dancers is indicative of disordered eating tendencies and has implications for eating disorders (Garner et al, 1991). Also, because this was seen in some dancers, it suggests that although dancers may be excessively lean and thin, there is still a great deal of pressure for a dancer to be thin (Lee, 1995).

When comparing the dancers to the control group, there were no statistically significant differences found. Significant differences were however seen between the field hockey and control group with the controls scoring significantly higher on the Drive for Thinness, Body Dissatisfaction and Interoceptive Awareness subscales. These differences in the Drive for Thinness and Body Dissatisfaction subscales may be indicative of the protective effect that some non-lean emphasized sports have on individuals who participate in them (Sundgot-Borgen, 1993). Although subjected to the same media and societal pressures to be thin, the field hockey group may benefit from participating in a sport that emphasizes performance not in relation to appearance whereas a lean emphasized activity such as dance emphasizes both performance and appearance. The Interoceptive Awareness subscale measures the ability to recognize and respond to emotional states. The higher score in the control group may be associated with the younger age. Also, the support of a team may provide a beneficial environmental effect for the field hockey players in dealing with emotional problems.

As with the DSP, the high EDI score seen in the control group may also be due to the

nature of the group. In the health education class they were attending, the majority of personal issues identified in term papers written for this class were on eating disorders and disordered eating tendencies. Therefore, due to the nature of the course, individuals that have health problems (eg. DET) may enroll. This may explain the elevated EDI scores in the control group.

Ways of Coping Questionnaire

The only significant difference in coping styles was seen between the field hockey and the control group with the controls using relatively more confrontive coping. This indicates that the controls tend to use a coping style that involves aggressive attempts to alter a situation. It is associated with a degree of hostility and risk taking (Lazarus and Folkman, 1988). However, this style of coping was not the main coping style that the controls used. In fact, the coping style that was used relatively more than all others in all three groups was Seeking Social Support (SSS). This is a style of coping associated with gaining support from significant others, from information available and from professionals. It is a problem focused coping style and one that is associated with lower levels of psychopathology and effective coping (Billings and Moos, 1981). However, although this active coping style was commonly used, there were several individuals that had DET. This may suggest that although these individuals report seeking social support, they may not have the skills to use their social network to the best of their ability and this may cause an increase in stress (Lacey et al., 1986). This may also lead them to resort to DET in an attempt to control their stress level (Pike and Rodin, 1991).

There were no other differences found between any of the groups or variables. Thus, many individuals used a variety of coping strategies for their stressful situation rather than focusing on one strategy. When analysing each individual's coping strategies, it was found that most individuals used all eight styles of coping to some degree with 3 or 4 strategies being used the most. This supports the idea that several coping strategies are generally used when dealing with stress and that no one strategy can be labelled effective or ineffective (Lazarus and Folkman, 1988). In fact, Lazarus (1993) states that a strategy may be highly effective and appropriate in one situation and completely inappropriate in others. To evaluate the effectiveness of the coping strategies that the subjects used, a brief description of the stressful encounter they were referring to would have been useful.

Differences between High and Low Risk

Because only 7 individuals were found to have elevated DT and BD scores a statistical analysis was deemed inappropriate to compare high and low risk subjects. A case study

approach was used to examine each high risk individual's physical characteristics, EDI, DSP and WCQ scores.

Dancer 1

The first dancer to be examined had the highest EDI scores of the entire sample. All of her subscale scores were above the 80th percentile for individuals with eating disorders, with the DT and BD scores at the 90th and 98th percentile respectively. This indicates that this individual is at a very high risk for developing an eating disorder. Also, the dancer had a lower weight (56.8 kg), BMI (19.18 kg/m^2) and SOS (42.9 mm). In fact, the BMI and SOS numbers put her in a health risk zone according to Canadian population norms (Health Canada, 1996). This low weight and low body composition coupled with elevated EDI scores is very problematic because this individual is very thin yet feels she should be thinner and is very dissatisfied with her body.

When examining the graphic profile of the DSP for this individual (Appendix H), the most elevated scores were found in the emotional response domain with the depression subscale over the 99th percentile of a normative group and the anxiety subscale at the 98th percentile of a normative group. All the other subscale scores except for the time pressure subscale were above the 70th percentile of standard norms, and also were higher than most of the other dancers.

The coping strategy that was used most often by Dancer 1 was Positive Reappraisal (29%). This is a strategy that involves focussing on personal growth to create positive meaning from a stressful event. It also includes the use of spirituality and religion to deal with stress. Seeking Social Support (14%), Accepting Responsibility (14%), and Self-Controlling (14%) were the second most used strategies and were all used equally. From this, it can be seen that this individual used a more active style of coping to deal with her stressful event. Active coping has been associated with lower levels of health problems (Billings and Moos, 1981). However, this subject had very high EDI scores and high levels of stress indicating that this type of coping may not have been effective for her. It may be that for the specific event this type of coping was not appropriate, or she may not have had personal skills developed to use each of these coping styles effectively.

Dancer 2

Dancer 2 had a BMI of 20.86 and SOS of 54.7 mm. Although these are in the healthy zone described by Health Canada (1996) they are lower than the average of both the field hockey players and the controls. They are however, higher than the averages of the dance group.

Dancer 2 had an elevated BD score of 19 which is at the 56th percentile of ED patients.

The DT score for this dancer was low (5), only at the 9th percentile. Therefore, this dancer was somewhat dissatisfied with her body but did not have a strong desire to be thinner. The higher BD score may indicate that, although she was quite thin and lean, because she is somewhat above the average for the dance group, she may have been dissatisfied with her body. The Bulimia, Ineffectiveness and Interpersonal Distrust (ID) scores were below the 50th percentile while the Perfectionism (P), IA and MF scores were above the 50th percentile.

The graphic profile (Appendix I) indicated that the stress subscale scores that were above the 50th percentile were the Time Pressure, Anxiety and Depression subscales. These subscales were at the 84th, 80th, and 88th percentile respectively.

The most common coping style used was Distancing (21%) with Self-Controlling (16%) and Escape Avoidance (16%) being used second most commonly. These strategies are mainly passive strategies and have been associated with higher levels of psychological problems (Lazarus and Folkman, 1988). This may be why this individual had higher BD, P, IA, and MF scores. Thus, this dancer used coping styles that have been deemed inappropriate in certain situations. It appears, due to her relatively high emotional stress level, that her coping capability needs to be improved.

Dancer 3

The third dancer in the high risk group had DT and BD scores of 17 and 22 respectively. These scores correspond to the 61st and 67th percentiles of ED patients. All other subscales of the EDI except the ID subscale were at or above the 50th percentile for ED patients. The BMI for this dancer was 19.71 which is at the upper end of the health benefit zone for her age. This BMI, coupled with a SOS (36.3 mm) which according to Canadian population norms is considered a health risk, suggests that she is at risk for health problems (Health Canada, 1996). Again, a very lean and light individual was reporting elevated EDI scores.

Like the other two dancers, the Depression and Anxiety subscales of the DSP were elevated (Appendix J). The Hostility subscale was also highly elevated in this dancer. The percentile rankings for these scores were 96th, 86th and 97th respectively. The time pressure subscale was also at the 94th percentile. All other subscales except the Driven Behaviour and the Health Environment subscales were above the 50th percentile for this dancer.

The coping strategy most used by this dancer was Accepting Responsibility (15%). However, Planful Problem Solving (14%), Confrontive Coping (13%), Distancing (13%) and Self Controlling (13%) were all used relatively the same amount. Therefore, this dancer used

almost all coping strategies to deal with the stressful event, but clearly was not successful in dissipating her stress. Thus, either she used coping strategies at the wrong time, or used each strategy ineffectively.

Summary of Dancers

With the dancers who were considered at risk, there was a definite trend with weight, body composition and stress levels. All three were very light and lean, with two being at risk for health problems according to Canadian population norms (Health Canada, 1996). Also, although only 3 dancers were considered at risk, this represents 27.3% of the total dance sample. This falls within the range of DET (8.2-46%) that has been seen in other athletic populations (Hamilton et al., 1988; le Grange et al., 1994) and is higher than the prevalence that has been reported in other dance populations (8.2%; le Grange et al.). These elevated scores along with the low weight and body composition show that these particular dancers feel a need to be thin and are dissatisfied with their bodies even though they are already lean.

The Emotional Response domain scores of all three dancers were also very high. This indicates that these dancers have higher levels of depression, anxiety and hostility. For two of the dancers, these high stress scores coupled with the high EDI scores suggest that they may have increased stress levels because of the desire to be thinner. It can be speculated that the pressure to be thin in their environment may be causing these dancers to have high levels of stress. This may also lead to conflicts with the dancers' instructors and peers which can also lead to increased levels of anxiety and hostility (Lee, 1995).

Coping proved to be an interesting area to examine. All three dancers used a different style of coping as the predominant style, and they also used several different strategies for one stressful event. Because these dancers had high levels of stress, and high EDI scores, it can be assumed that the coping used was not effective for them. Therefore, this supports the suggestion that although a specific coping style can be associated with better health, that particular style may not be effective in every situation and for every individual (Lazarus, 1993). In fact, two of the dancers used coping styles that were active and considered more effective than others yet they still had DET. They may also lack the skills to use these coping styles effectively (Lacey et al., 1986). Because these dancers have ineffective coping strategies, it may be beneficial for these dancers to learn coping skills and how to apply those skills to each stressful situation that they face. Therefore, a possible intervention for these dancers would be the development of a stress management workshop that focuses on coping strategies and application of those

strategies. In addition, the WCQ could also be used in an interview situation where the stressful event would be described. This would help to clarify what the stressors were and why the particular coping strategy was chosen. This could then be used in an intervention program to help individuals learn how to use appropriate coping, in an effort to enhance their coping power.

Control 1

The first control subject in the high risk group had a DT score of 8 and a BD score of 21. These scores correspond to the 17th and 60th percentile ranks for ED patients. The Perfectionism and Maturity Fears subscales were also above the 50th percentile rank. This subject was also very light and lean with a BMI and SOS of 17.92 and 51.9 respectively. Thus, this was a relatively lean individual with high body dissatisfaction.

The DSP scores for this subject were also elevated with only 3 (Attitude Posture, Domestic Environment, Health Posture) ranking under the 50th percentile (Appendix K). The highest score was in the Role Definition subscale (94th percentile). The Anxiety subscale ranked in the 92nd percentile. The Vocational Environment, Hostility and Depression subscales also ranked above the 80th percentile.

The main coping strategy used was Confrontive Coping (18%). Seeking Social Support (15%) and Planful Problem Solving (15%) were also used to a relatively high degree. Like the dancers, this subject used active coping strategies yet she had high EDI scores. This again may mean the either the coping strategies used were inappropriate for the situation, or that they were not used effectively.

Control 2

The second control subject had a score of 17 on DT and 13 on BD. The DT score was ranked at the 61st percentile and was the only EDI score for this subject that ranked above the 50th percentile. The BMI and SOS were found to be in the health benefit zone for her age with a measure of 20.06 and 58.1 respectively. This individual was fairly lean but still had an elevated DT indicating a desire to be thin, a potentially dangerous combination.

The DSP scores for this subject were relatively lower than those of the other at risk subjects with only 3 ranking above the 50th percentile (Appendix L). The two highest score were from the Anxiety and Depression subscales (82nd, 82nd percentile). The third highest was the Attitude Posture subscales (80th percentile).

Self-controlling was the strategy that was used the most relative to the other strategies (21%). Seeking Social Support (18%) and Accepting Responsibility (16%) were also used

relatively often with Escape-Avoidance (3%) being used very seldom compared to the other strategies. As with the other at risk subjects, active coping strategies were used yet EDI scores and stress levels were still elevated. This indicates that coping strategies chosen were either inappropriate or ineffectively employed.

Control 3

This control subject had DT and BD scores of 12 and 24 respectively. The BD score ranked in the 75th percentile. The other subscale that ranked above 50 was the Ineffectiveness subscale. This subject was heavier and fatter than all other high risk subjects with a weight, BMI and SOS of 71.5 kg, 25.33 kg/m^2, and 109.5 mm respectively. The SOS is indicative of health risk and the BMI is at the high end of the health benefit zone for an individual of this age group according to Canadian population norms (Health Canada, 1996). The high BD score of this individual may be attributed to the increased weight and high body fat. Marshall and Harber (1996) also found that some fatter individuals had higher BD scores and attributed the body dissatisfaction to the higher body fat .

The highest stress score was on the Depression subscale of the DSP. This score ranked above the 99th percentile (Appendix M). This high score could be attributed to the high body fat of the individual coupled with a high BD. Other scores that were highly elevated were the Anxiety and the Vocational Environment subscales (92nd and 93rd percentiles, respectively). The Time Pressure, Role Definition, Domestic Environment, and Hostility subscales were also all above the 50th percentiles.

Escape-Avoidance and Seeking Social Support were both used 18% of the time by this subject and were the most used coping strategies. Planful Problem Solving was also used often (17%). Escape-Avoidance is a passive coping strategy that has been seen in patients with eating disorders (Troop et al., 1994). However, Seeking Social Support was also used equally and this is usually associated with health benefits. The subject also had a high level of stress from her vocational environment. It could be speculated that her job was causing her stress and she may have turned to other co-workers for support and they may not have been able to help her. Also, if she turned to someone outside the work environment for help, they may not have been sympathetic to her problems and may have added to her stress. Therefore, the social support may not have been effective for this person. Whatever the reason, it is clear by her stress scores that the coping strategies she employed were not effective.

Control 4

The final control subject had scores of 18 on the DT and 23 on the BD subscales of the EDI. These ranked in the 73rd and 70th percentiles respectively. No other subscales ranked above the 50th percentile for ED patients. The subject had a BMI of 22.42 and a SOS of 65.8, both of which fall into the health benefit zone according to Canadian population norms (Health Canada, 1996). As with the other lean individuals, this combination could be potentially dangerous.

The highest DSP subscale scores were the Anxiety and Depression subscales of the DSP. These were ranked int the 84th and 85th percentile respectively (Appendix N). The Attitude Posture, Role Definition and Vocational Environment were also ranked above the 50th percentile for this subject.

Seeking Social Support was used the most by this subject (22%) with Accepting Responsibility (15%), Distancing (14%), and Self-Controlling (14%) all being used in similar amounts to cope with a stressful event. Despite the fact that a variety of strategies were used, they were relatively ineffective in managing the stress encountered.

Summary of Control Case Studies

Of the total control population, 4 (19%) were found to have negative eating attitudes and behaviours. This is higher than the DET range that has been reported in the general population of 3-5.4% (Gotestam and Agras, 1995; Whitehouse et al., 1992). As with the dancers, all except one of the controls were lean with high EDI scores. However, only one of the control subjects was considered to be in a health risk zone because she was too lean. The final high risk control was in a heath risk zone because she was too fat. The high DT and BD scores seen in lean individuals can be very problematic and dangerous. However, although the high DT and BD scores in the fatter individual may be justified or more easily understood, if this individual does not use an appropriate means of weight loss and control, she could still develop an eating disorder. It has been shown that individuals with DET have gone on to develop ED (Garner et al., 1987).

With regards to stress, the subscales of the Emotional Response domain were elevated. The Vocational Environment subscale of the DSP was also elevated in 3 of the 4 controls. This may suggest that the controls, which were a group selected from an undergraduate university course, are unsatisfied and unhappy with their vocation. It may be that being a student is very stressful to them. Also, they may be working part time to help supplement their tuition. If this

job is not related to their area of interest, it may be quite stressful for them. This dissatisfaction and stress from their vocation may in turn increase their levels of depression and anxiety resulting in elevated scores in these subscales.

Several different coping strategies were used by all the controls. Because DET and high levels of stress were seen although active coping strategies were used, it suggests that the coping strategy chosen was inappropriate at the time or it was used ineffectively. This suggests that an area for stress management and DET prevention may be to teach individuals appropriate coping strategies and how to employ these strategies effectively. Of interest, Seeking Social Support was used as the first or second coping strategy by all the at risk controls. This is contrary to the hypothesis that individuals with DET would not use Seeking Social Support very often. It may be that the support network that was chosen did not help with the stressful situation but may have added to the stress.

Summary of Case Studies

When examining the different individuals that were considered to be at risk for developing an eating disorder, several trends were found. All except one of the subjects were relatively light and lean. Despite this relative leanness, these individuals had either a distorted idea of their body weight and size and therefore a high degree of body dissatisfaction or a strong desire to be thin, or in extreme cases, a combination of both. This body distortion and body image dissatisfaction has been found in individuals with eating disorders and disordered eating tendencies (Fabian and Thompson, 1989; Horne et al., 1991, Paxton et al., 1991; Sunday et al., 1992). This supports the notion that these specific individuals may be at risk for developing an eating disorder.

When examining DSP scores, several interesting trends were found. All of the 7 subjects had elevated scores on the subscales that comprise the Emotional Response domain. These subscales are Hostility, Anxiety and Depression. In fact, all but one had either the Hostility, Anxiety or Depression subscale as their highest subscale score. These elevated scores in the Emotional Response domain were also found by Soukup et al. (1991) when studying patients with eating disorders in a clinical setting. Therefore, this may indicate that it is one's emotional stress that may lead to elevated disordered eating tendencies. In fact, depression is associated with eating disorders and has been found in patients with anorexia and bulimia (Cooper, 1995; Garfinkel, 1995). Also, because a preoccupation with weight gain is associated with elevated EDI scores and with eating disorders (Garfinkel, 1995), an individual who is

dissatisfied with their body may be constantly worrying about how to alter their body shape and size. This can lead to an elevated Anxiety score because this scale measures symptoms such as worry, nervousness, and tension.

This suggests that something involving an individual's emotions and how that individual deals with those emotions is affecting the onset of disordered eating tendencies. These results support other research that has found that individuals diagnosed with eating disorders have elevated stress scores (Leal et al., 1995; Soukup et al., 1990). However, no other studies have been done on individuals with disordered eating tendencies and therefore this is the first indication that higher levels of stress are also seen in those with DET.

Past research has demonstrated that individuals with eating disorders have been found to focus mainly on one type of coping strategy (Troop et al, 1994). These studies have also found that the patients with eating disorders used more Escape-Avoidance and Wishful Thinking types of strategies than Seeking Social Support and Positive Reappraisal, which was contrary to the findings of the present study. It was found that each individual used a different combination of coping strategies. These results are similar to those of the low risk group. However, for whatever reason, the combination of strategies used by the at risk group were ineffective. They were either employed in an ineffective manner or at an inappropriate time. To better understand why and how the various coping methods were used, a written explanation of the stressful event would have been useful.

Model

A model was hypothesized to explain the relationship between stress, coping and disordered eating tendencies (Appendix A). This model proposed that several factors would lead to an increased level of stress. These factors included internal, external, environmental and other stressors. It also proposed that coping would be the determining factor in developing disordered eating tendencies. Because only stress levels and coping strategies were assessed in this study, and other factors such as self esteem and body image distortion were not assessed, this model could not fully be tested. However, certain trends were found that may help to modify this model. It was found that stress was related to disordered eating behaviour because all at risk individuals had high levels of emotional stress, and the total EDI score was related to the total stress score of the EDI. However, because several coping strategies were used by all subjects, the role of coping in the development of DET could not fully be explained from the data gathered in this study. It seems that the coping used by the at risk subjects was ineffective, as

their stress scores were relatively high. However, the reason for the ineffectiveness of their coping strategies was not readily apparent. It may also be that the individuals had very high stress levels and the coping strategies used decreased the stress, but not to a healthy level. Also, other coping strategies may have been used that have not been identified in the WCQ. Again, a written description of the stressful event that was assessed would be useful in helping to understand the role of coping in the development of DET. Further research is needed in this area. A more comprehensive study that assesses all aspects of the model in a variety of populations is required.

VI. CONCLUSIONS

A positive relationship was seen between the total Eating Disorder Inventory (EDI) score and the Total Stress Score of the Derogatis Stress Profile (DSP). This supports the initial hypothesis that a relationship between stress and disordered eating tendencies (DET) would be seen. Several other significant relationships were found between the EDI and DSP subscales. The most common relationships were seen between the Anxiety and Depression subscales of the DSP and 5 of 8 EDI subscales indicating that a higher level of emotional stress has an impact on DET. Stress levels did not seem to vary greatly between the three groups. This may have been due to the lower number of dance subjects used or the fact that the DSP does not assess the stress related to being thin that is encountered by dancers. Future research could utilize a modified version of the DSP that includes questions that address this type of environmental stress, or a different questionnaire could be developed for a dance population. Significant differences were seen between the field hockey and control groups indicating that the controls had a higher level of dissatisfaction with their vocation. Since the controls were university students it may indicate that they were not happy with either university, or if they work outside of the university setting, with their part-time jobs. This therefore suggests that stress management programs may be important for a university population.

Contrary to the hypotheses, significant differences were not found in stress levels and EDI scores between the dance and field hockey group, which was surprising. Therefore, an environmental effect was not seen in level of DET. However, when analysing the groups separately, 3 (27.3%) of the dancers were found to be at risk whereas no field hockey players were identified. The at risk dancers were significantly leaner than the field hockey group, indicating that there may be a problem with attitudes towards eating and weight loss with these specific dancers and that the pressure to be thin may be higher in the dance population. It also suggests that a dance population would be a reasonable target for prevention programs.

It was also hypothesized that the dancers would score higher than the controls on the DT, Bulimia and BD subscales of the EDI. However, the dancers and controls were not found to have significantly different scores. This may indicate that the control group may feel the same pressures for being thin that the dancers feel. However, this pressure for the controls must come from a different source, for example societal pressure to be thin, which has been seen as a trigger for disordered eating (Wiseman et al., 1992).

Significant differences were noted between the control and field hockey group on 3

subscales of the EDI with the controls having higher scores than the field hockey players. Because the field hockey group had the lowest scores of all the three groups, it may indicate that the field hockey environment has a protective effect against negative eating attitudes and behaviours.

The elevated EDI scores in the control group may also be indicative of an inappropriate control. These scores may reflect that the type of individual enrolled in a Health Education class may be there because she feels she may have a health problem. This may affect generalizability in the general population; however, it may suggest that a university population be targeted for eating disorder prevention and stress management programs in the future.

When comparing high and low risk individuals, there were some differences seen in stress levels. Generally, the emotional response domain of the DSP was elevated in individuals with higher EDI scores. This suggests that ineffectively handling emotional situations may lead to increased stress and ultimately may affect eating behaviour. Thus a reasonable direction for DET prevention and stress management for individuals with DET is to target emotional health and help them deal with feelings of hostility, anxiety and depression. Further research is also needed to understand why emotional stress may be affecting eating behaviour. To better understand this relationship, it may be important to interview subjects and to use other tests that evaluate emotional stress to find the link between this type of stress and DET.

Coping was not found to be significantly different between any groups. All three populations tended to use a variety of coping strategies as did the high risk individuals. This may indicate that a specific coping style may not be inappropriate as has been suggested by some authors (Billings and Moos, 1981). Although many subjects used multiple strategies, it is unlikely that all strategies used were effective because stress levels remained very high, particularly in the high risk subjects. It may be that the stress levels were higher than reported and the coping strategy somewhat reduced the stress but not to a healthy level. This may also be because the coping strategies themselves were ineffective, or they may have been employed at an inappropriate time. Therefore, a stress management strategy for these individuals would include an analysis of current coping techniques, an enhancement of the way those techniques are applied, and the teaching of new techniques, all in an attempt to enhance coping power.

Certain coping strategies may have been used that are not identified by the WCQ. Therefore, to better understand the specific choice of coping, a description of the stressful situation being analysed would be useful in further research. Also, because coping changes with

situation and time, repeated measures of the WCQ would be useful to gain a more exact understanding of an individual's coping strategies. In addition, interviews with regards to effectiveness of coping strategies would be important to include in future research.

With regards to the hypothesized model, it seems that, according to the present data, stress does play a role in the development of DET. The role of coping is not clear given the data collected in the present study. To better test coping in this model, structured interviews or a written description of the stressful event would be useful.

Implications and Recommendations for the Future

The small number of dance subjects may also have had an effect on significance. Future research should try to include larger numbers of dance subjects. However, given the difficulty in recruiting dance subjects for research in eating disorders, future researchers must find a way to attract subjects.

Future research needs to be done to better understand the role of stress in the development of DET. With regards to dancers, a better tool to assess stress needs to be developed. This would include an assessment on how the pressure to be thin in a dance environment adds to the dancer's level of stress. Also, the role of Depression and Anxiety needs to be further explored.

The role of coping also needs to be better understood. From the present data, it seems that several coping strategies were used by at risk subjects, yet these strategies did not seem to be effective. A qualitative analysis of coping style is necessary to understand why certain strategies are chosen in specific situations.

To better test the hypothesized model, all aspects of the model including the internal, external, environmental and other stressors need to be tested. Also, a better assessment of coping needs to be used.

Although significant differences were not found between the dance and field hockey group, the elevated scores in 27.3% of the dancers and the significantly higher EDI scores in the control group indicates that there is a need for eating disorder prevention programs in these two populations. The elevated stress scores in the high risk individuals also suggests that stress is a factor in the development of disordered eating tendencies.

This indicates that there is a need for health promotion programs in a ballet dance and university community. These programs could center around the issue of ED prevention and target eating attitudes and behaviour and stress management strategies. For the ballet dance

community, the programs should be targeted at both the dancers and the dance master or choreographers because these individuals are very influential in dancer's lives and their opinions are highly respected by the dancers. Also, the coping strategies used by the high risk group did not seem to be effective, thus a program that would focus on the proper selection and use of coping strategies would be beneficial.

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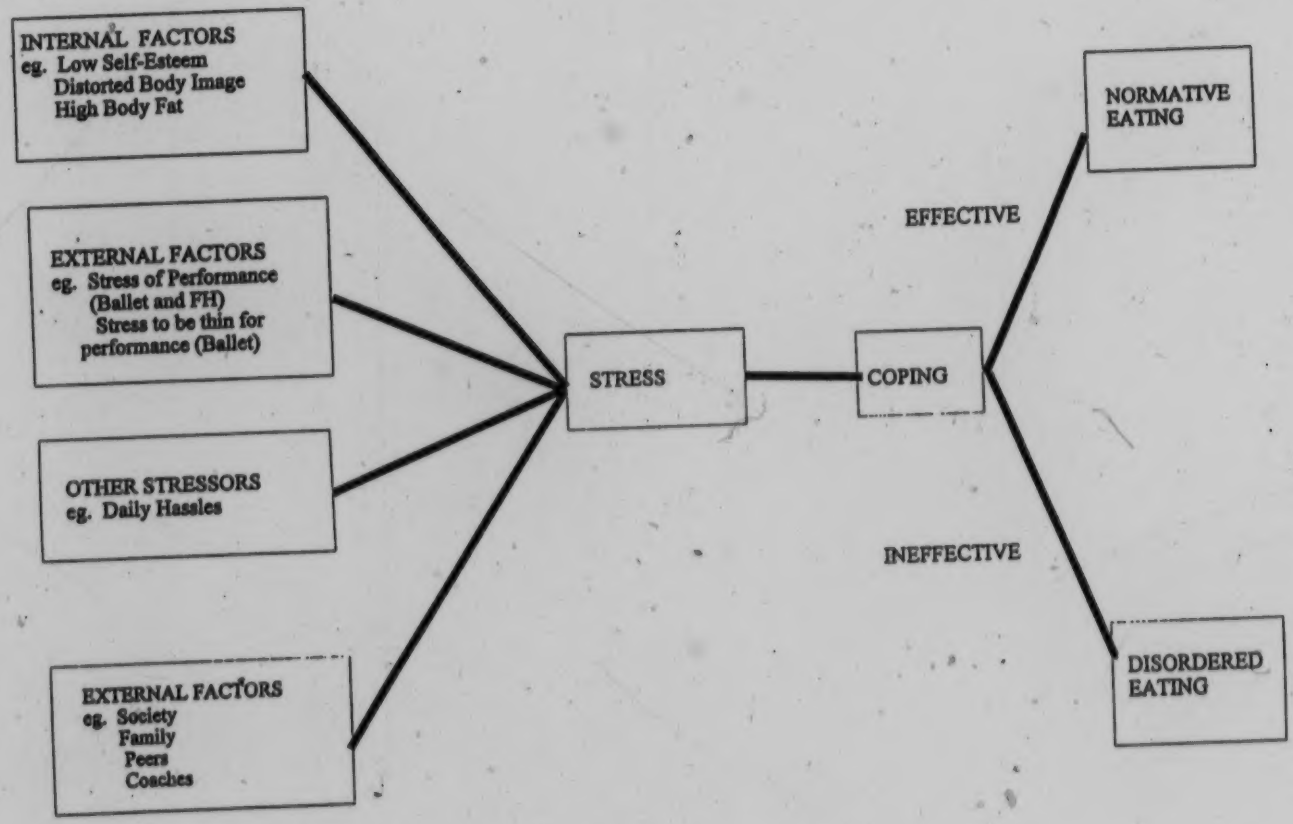
APPENDIX A
MODEL



APPENDIX B

UNIVERSITY OF ALBERTA
Department of Physical Education and Recreation

SUBJECT CONSENT
The Relationship Between Stress, Coping and Eating Behaviour

INVESTIGATOR
Cynthia Puddu, Dr. D. Marshall, Dr. M. Padfield, Dr. C. Hanrahan, and Dr. L. McGarger

I _____ (Subject's name) am giving my consent to participate in this research study. In doing so , I understand fully all the following statements:

1. The information to be collected includes: height, weight, 5 skinfold thickness measurements (triceps, biceps, subscapular, supra iliac, and mid-calf), and 3 questionnaires (stress, coping, and eating attitudes and behaviours). The total time required for my participation is about 1.5 hours.

2. I have been informed of the possible benefits of my participation in this project and understand that there is virtually no risk associated with my participation.

3. I understand that I am voluntarily participating in this study and have the right to withdraw from the study at any time.

4. I expect to have my confidentiality and that of my company fully protected during the time of the study, in the future and in any published results. Results will only be published in scholarly publications.

5. I understand that any questions I have related to any part of the study will be answered fully and to my total satisfaction.

6. I understand that should I feel the need to contact a health professional for any reason at any time during the study, I will be referred to an appropriate person.

7. I hereby make available to Cynthia Puddu and her committee all results obtained as a consequence of my participation in this project, whether these results are in individual or group form.

8. I understand that there will be no financial renumeration for my participation in this study.

9. I further certify that all procedures in which I will be involved have been fully explained to me. I hereby declare that I am totally satisfied with these explanations.

Subject's name (print)	Subject's signature	Date
Witness name (print)	Witness signature	Date
Investigator's name (print)	Investigator's signature	Date

PLEASE CONTACT CYNTHIA PUDDU (403) 433-4520 OR DR. DRU MARSHALL (403) 492-1035 WITH ANY QUESTIONS ABOUT THE STUDY

APPENDIX C

SCREENING AND INFORMATION QUESTIONNAIRE

SUBJECT ID# _____

How old are you? _____ YRS

Birth date _____
day/month/year

Have you ever been diagnosed with any kind of mental illness (eg. Depression, Schizophrenia)? YES ____ NO____

Are you presently not performing (dancers) or competing (field hockey) at this time for any reason? YES ____ NO____

Would you like the results of this study to be sent to you? YES ____ NO____

Please indicate the address you wish to have the results mailed to:

_____

_____

_____

_____

_____

IF YOU HAVE SPECIFIC QUESTIONS FOLLOWING THIS STUDY, PLEASE REFER TO THE SUBJECT ID# AT THE TOP.

APPENDIX D
DEROGATIS STRESS PROFILE

DSP®

Name: _____ Age: _____ Sex: M ____ F ____ Date: _____

I.D. No: ___ ___ _____ Location: _____

Marital Status: Single _____ Married _____ Separated _____ Widowed _____ Divorced _____

Education: _____ Job Description: _____

INSTRUCTIONS

Below are a series of statements that describe the way some people feel about themselves. Please read each statement carefully and select one of the numbered descriptors below to indicate the extent to which the statement is true of you. Consider yourself as you typically behave or feel, and place the descriptor number in the open block to the right of the statement. If you change your mind, erase your first selection completely. If you have any questions, ask the technician.

DESCRIPTORS:

0 = Not at all true of me
1 = Slightly true of me
2 = Moderately true of me
3 = Very true of me
4 = Extremely true of me

1. I feel there is never enough time to get things done . . . . . ☐
2. I rarely have feelings of being trapped or caught in life . . . . . ☐
3. I feel rules were made to be broken . . . . . ☐
4. I take some time out almost every day just to relax . . . . . ☐
5. I laugh easily . . . . . ☐
6. My job provides me many opportunities for challenging and satisfying activities . . . . . ☐
7. When I am on vacation with my family I don't have as much fun as I think I should . . ☐
8. I get into frequent arguments . . . . . ☐
9. I rarely feel tense and under pressure . . . . . ☐
10. I rarely exercise . . . . . ☐
11. I feel no interest in things . . . . . ☐
12. I would like to be with my family more, but I can never seem to find the time . . . . . ☐
13. I neve: worry about being a "workaholic" . . . ☐
14. I believe that if you don't beat the other guy to the punch, he will beat you . . . . . ☐
15. I never sit still for very long . . . . . ☐
16. I am not very good at telling funny stories or jokes . . . . . ☐
17. I get great pleasure from the people I work with . . . . . ☐
18. I have a satisfying sex life . . . . . ☐
19. I have no problems with control of my temper . . . . . ☐
20. I am usually worried about something . . . . . ☐
21. I smoke too much . . . . . ☐
22. I rarely feel lonely . . . . . ☐
23. When I eat, I usually take my time . . . . . ☐
24. I frequently say I am going to spend less time on work, but I don't seem to be able to . . . . . ☐
25. Most things I do I see as a challenge . . . . . ☐
26. I am not very interested in hobbies or sports . . . ☐
27. I seem to be more focused on the future than the present . . . . . ☐
28. My full range of talents are not utilized on my job . . . . . ☐
29. I have a good relationship with my wife/ husband (or unmarried partner) . . . . . ☐
30. Sometimes I just feel like hitting somebody . . . ☐
31. I rarely feel nervous or uptight . . . . . ☐
32. I am in good physical shape . . . . . ☐
33. I sometimes have feelings of worthlessness . . . . . ☐
34. I rarely feel pressed for time . . . . . ☐

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PLEASE CONTINUE ON OTHER SIDE ▶

DSP®

DESCRIPTORS:

0 = Not at all true of me
1 = Slightly true of me
2 = Moderately true of me
3 = Very true of me
4 = Extremely true of me

35. The more things I achieve in life the less I seem to enjoy them ☐
36. I tend to be impatient. ☐
37. I sometimes just "tune out" of work and get involved in other things. ☐
38. Sex is an important part of life for me. ☐
39. I am frequently frustrated in my work. ☐
40. Interacting with my family and friends is a great source of enjoyment for me. ☐
41. I rarely have angry thoughts about people. ☐
42. When I know I have something unpleasant to do I worry about it for a long time. ☐
43. I don't take antacids for heartburn or gas. ☐
44. I usually have plenty of energy. ☐
45. I enjoy being under pressure and doing a good job on many projects at the same time. ☐
46. I really look forward to my vacations. ☐
47. I make a serious effort to achieve a balance between work and fun. ☐
48. It is not difficult for me to unwind after work. ☐
49. I really believe it is lonely at the top. ☐
50. Doing my job gives me a good feeling about myself. ☐
51. I have a good balance between family activities and work activities. ☐
52. I get easily annoyed or irritated. ☐
53. I frequently have the feeling that something bad is going to happen to me. ☐
54. I believe having good health is more important than anything. ☐
55. Sometimes I feel hopeless about the future. ☐
56. When I am driving the car, I almost never rush through traffic. ☐
57. Every day I must get something tangible accomplished or I don't feel good about myself. ☐
58. I feel the most important thing in life is that you achieve something with it. ☐
59. The idea of meditation or relaxation training has not had much appeal for me. ☐
60. I believe you can get a lot of help from others in getting the job done in life. ☐
61. There are significant parts of my job that are frankly dull and boring. ☐
62. I don't interact much with friends or neighbors. ☐
63. I rarely clench my fists during conversation. ☐
64. I rarely let things get me anxious or tense because I know they always get worked out somehow. ☐
65. I am very careful about my diet. ☐
66. I sometimes have thoughts of ending my life. ☐
67. When I have an appointment I rarely arrive late or at the last minute. ☐
68. Once I get started on a project, I don't like to stop until I am finished. ☐
69. I believe competition builds character and is good for you. ☐
70. I have trouble relaxing. ☐
71. I believe life is a struggle and you don't get anything for free out of it. ☐
72. When I wake up in the morning, I really look forward to going to work. ☐
73. I really enjoy going to parties and meeting people. ☐
74. If someone expresses a stupid idea, I rarely publicly disagree. ☐
75. Sometimes I feel tense and anxious for no apparent reason. ☐
76. I take tranquilizers to relax or sleep. ☐
77. I rarely blame myself unduly for things that go wrong. ☐

Please indicate what you believe your current level of stress to be by placing an "X" on the line below.

Totally Free of Stress ●——————————● Extremely Highly Stressed

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APPENDIX E
EATING DISORDER INVENTORY

This is a scale which measures a variety of attitudes, feelings and behaviours. Some of the items relate to food and eating. Others ask you about your feelings about yourself. THERE ARE NO RIGHT OR WRONG ANSWERS SO TRY VERY HARD TO BE COMPLETELY HONEST IN YOUR ANSWERS. Read each question and mark the optical scoring sheet in the following manner:

a= always
b= usually
c= often
d= sometimes
e= rarely
f= never

PLEASE DO NOT MARK YOUR ANSWERS ON THESE SHEETS!

Be sure to fill in a complete circle on your form with the provided pencil.
Please answer each question very carefully. RESULTS ARE COMPLETELY CONFIDENTIAL.
Thank you.

A	B	C	D	E	F	
ALWAYS	USUALLY	OFTEN	SOMETIMES	RARELY	NEVER	
( )	( )	( )	( )	( )	( )	1. I eat sweets and carbohydrates without feeling nervous.
( )	( )	( )	( )	( )	( )	2. I think that my stomach is too big.
( )	( )	( )	( )	( )	( )	3. I wish that I could return to the security of childhood.
( )	( )	( )	( )	( )	( )	4. I eat when I am upset.
( )	( )	( )	( )	( )	( )	5. I stuff myself with food.
( )	( )	( )	( )	( )	( )	6. I wish that I could be younger.
( )	( )	( )	( )	( )	( )	7. I think about dieting.
( )	( )	( )	( )	( )	( )	8. I get frightened when my feelings are too strong.
( )	( )	( )	( )	( )	( )	9. I think that my thighs are too large.
( )	( )	( )	( )	( )	( )	10. I feel ineffective as a person.
( )	( )	( )	( )	( )	( )	11. I feel extremely guilty after overeating.
( )	( )	( )	( )	( )	( )	12. I think that my stomach is just the right size.
( )	( )	( )	( )	( )	( )	13. Only outstanding performance is good enough in my family.
( )	( )	( )	( )	( )	( )	14. The happiest time in life is when you are a child.
( )	( )	( )	( )	( )	( )	15. I am open about my feelings.

A B C D E F

ALWAYS USUALLY OFTEN SOMETIMES RARELY NEVER

( ) ( ) ( ) ( ) ( ) ( ) 16. I am terrified of gaining weight.

( ) ( ) ( ) ( ) ( ) ( ) 17. I trust others.

( ) ( ) ( ) ( ) ( ) ( ) 18. I feel alone in the world.

( ) ( ) ( ) ( ) ( ) ( ) 19. I feel satisfied with the shape of my body.

( ) ( ) ( ) ( ) ( ) ( ) 20. I feel generally in control of things in my life.

( ) ( ) ( ) ( ) ( ) ( ) 21. I get confused about what emotion I am feeling.

( ) ( ) ( ) ( ) ( ) ( ) 22. I would rather be an adult than a child.

( ) ( ) ( ) ( ) ( ) ( ) 23. I can communicate with others easily.

( ) ( ) ( ) ( ) ( ) ( ) 24. I wish I were someone else.

( ) ( ) ( ) ( ) ( ) ( ) 25. I exaggerate or magnify the importance of weight.

( ) ( ) ( ) ( ) ( ) ( ) 26. I can clearly identify what emotion I am feeling.

( ) ( ) ( ) ( ) ( ) ( ) 27. I feel inadequate.

( ) ( ) ( ) ( ) ( ) ( ) 28. I have gone on eating binges where I have felt that I could not stop.

( ) ( ) ( ) ( ) ( ) ( ) 29. As a child, I tried very hard to avoid disappointing my parents teachers.

( ) ( ) ( ) ( ) ( ) ( ) 30. I have close relationships.

( ) ( ) ( ) ( ) ( ) ( ) 31. I like the shape of my buttocks.

( ) ( ) ( ) ( ) ( ) ( ) 32. I am preoccupied with the desire to be thinner.

( ) ( ) ( ) ( ) ( ) ( ) 33. I don't know what's going on inside me.

( ) ( ) ( ) ( ) ( ) ( ) 34. I have trouble expressing my emotions to others.

( ) ( ) ( ) ( ) ( ) ( ) 35. The demands of adulthood are too great.

( ) ( ) ( ) ( ) ( ) ( ) 36. I hate being less than best at things.

( ) ( ) ( ) ( ) ( ) ( ) 37. I feel secure about myself.

( ) ( ) ( ) ( ) ( ) ( ) 38. I think about bingeing (overeating).

( ) ( ) ( ) ( ) ( ) ( ) 39. I feel happy that I am not a child anymore.

A B C D E F

ALWAYS USUALLY OFTEN SOMETIMES RARELY NEVER

( ) ( ) ( ) ( ) ( ) ( ) 40. I get confused as to whether or not I am hungry.

( ) ( ) ( ) ( ) ( ) ( ) 41. I have a low opinion of myself.

( ) ( ) ( ) ( ) ( ) ( ) 42. I feel that I can achieve my standards.

( ) ( ) ( ) ( ) ( ) ( ) 43. My parents have expected excellence of me.

( ) ( ) ( ) ( ) ( ) ( ) 44. I worry that my feelings will get out of control.

( ) ( ) ( ) ( ) ( ) ( ) 45. I think my hips are too big.

( ) ( ) ( ) ( ) ( ) ( ) 46. I eat moderately in front of others and stuff myself when they're gone.

( ) ( ) ( ) ( ) ( ) ( ) 47. I feel bloated after eating a small meal.

( ) ( ) ( ) ( ) ( ) ( ) 48. I feel that people are happiest when they are children.

( ) ( ) ( ) ( ) ( ) ( ) 49. If I gain a pound, I worry that I will keep gaining.

( ) ( ) ( ) ( ) ( ) ( ) 50. I feel that I am a worthwhile person.

( ) ( ) ( ) ( ) ( ) ( ) 51. When I am upset, I don't know if I am sad, frightened or angry.

( ) ( ) ( ) ( ) ( ) ( ) 52. I feel that I must do things perfectly or not do them at all.

( ) ( ) ( ) ( ) ( ) ( ) 53. I have the thought of trying to vomit in order to lose weight.

( ) ( ) ( ) ( ) ( ) ( ) 54. I need to keep people at a certain distance (feel uncomfortable if someon tries to get too close).

( ) ( ) ( ) ( ) ( ) ( ) 55. I think that my thighs are just the right size.

( ) ( ) ( ) ( ) ( ) ( ) 56. I feel empty inside (emotionally).

( ) ( ) ( ) ( ) ( ) ( ) 57. I can talk about personal thoughts or feelings.

( ) ( ) ( ) ( ) ( ) ( ) 58. The best years of your life are when you become an adult.

( ) ( ) ( ) ( ) ( ) ( ) 59. I think by buttocks are too large.

( ) ( ) ( ) ( ) ( ) ( ) 60. I have feelings I can't quite identify.

( ) ( ) ( ) ( ) ( ) ( ) 61. I eat or drink in secrecy.

( ) ( ) ( ) ( ) ( ) ( ) 62. I think that my hips are just the right size.

( ) ( ) ( ) ( ) ( ) ( ) 63. I have extremely high goals.

( ) ( ) ( ) ( ) ( ) ( ) 64. When I am upset, I worry that I will start eating.

APPENDIX F
WAYS OF COPING QUESTIONNAIRE

Instructions

To respond to the statements in this questionnaire, you must have a specific stressful situation in mind. Take a few moments and think about the most stressful situation that you have experienced in the *past week*.

By "stressful" we mean a situation that was difficult or troubling for you, either because you felt distressed about what happened, or because you had to use considerable effort to deal with the situation. The situation may have involved your family, your job, your friends, or something else important to you. Before responding to the statements, think about the details of this stressful situation, such as where it happened, who was involved, how you acted, and why it was important to you. While you may still be involved in the situation, or it could have already happened, it should be the most stressful situation that you experienced during the week.

As you respond to each of the statements, please keep this stressful situation in mind. Read each statement carefully and indicate, by circling 0, 1, 2 or 3, to what extent you used it in the situation.

Key: 0= Does not apply or not used 1= Used somewhat
2= Used quite a bit 3= Used a great deal

Please try to respond to every question.

0 = Does not apply or not used 1 = Used somewhat 2 = Used quite a bit 3 = Used a great deal

1. I just concentrated on what I had to do next – the next step.	0	1	2	3
2. I tried to analyze the problem in order to understand it better.	0	1	2	3
3. I turned to work or another activity to take my mind off things.	0	1	2	3
4. I felt that time would have made a difference – the only thing was to wait.	0	1	2	3
5. I bargained or compromised to get something positive from the situation.	0	1	2	3
6. I did something that I didn't think would work, but at least I was doing something.	0	1	2	3
7. I tried to get the person responsible to change his or her mind.	0	1	2	3
8. I talked to someone to find out more about the situation.	0	1	2	3
9. I criticized or lectured myself.	0	1	2	3
10. I tried not to burn my bridges, but leave things open somewhat.	0	1	2	3
11. I hoped for a miracle.	0	1	2	3
12. I went along with fate; sometimes I just have bad luck.	0	1	2	3
13. I went on as if nothing had happened.	0	1	2	3
14. I tried to keep my feelings to myself.	0	1	2	3
15. I looked for the silver lining, so to speak; I tried to look on the bright side of things.	0	1	2	3
16. I slept more than usual.	0	1	2	3
17. I expressed anger to the person(s) who caused the problem.	0	1	2	3
18. I accepted sympathy and understanding from someone.	0	1	2	3
19. I told myself things that helped me feel better.	0	1	2	3
20. I was inspired to do something creative about the problem.	0	1	2	3
21. I tried to forget the whole thing.	0	1	2	3
22. I got professional help.	0	1	2	3

Go on to next page

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0 = Does not apply or not used 1 = Used somewhat 2 = Used quite a bit 3 = Used a great deal

23. I changed or grew as a person.	0	1	2	3
24. I waited to see what would happen before doing anything.	0	1	2	3
25. I apologized or did something to make up.	0	1	2	3
26. I made a plan of action and followed it.	0	1	2	3
27. I accepted the next best thing to what I wanted.	0	1	2	3
28. I let my feelings out somehow.	0	1	2	3
29. I realized that I had brought the problem on myself.	0	1	2	3
30. I came out of the experience better than when I went in.	0	1	2	3
31. I talked to someone who could do something concrete about the problem.	0	1	2	3
32. I tried to get away from it for a while by resting or taking a vacation.	0	1	2	3
33. I tried to make myself feel better by eating, drinking, smoking, using drugs, or medications, etc.	0	1	2	3
34. I took a big chance or did something very risky to solve the problem.	0	1	2	3
35. I tried not to act too hastily or follow my first hunch.	0	1	2	3
36. I found new faith.	0	1	2	3
37. I maintained my pride and kept a stiff upper lip.	0	1	2	3
38. I rediscovered what is important in life.	0	1	2	3
39. I changed something so things would turn out all right.	0	1	2	3
40. I generally avoided being with people.	0	1	2	3
41. I didn't let it get to me; I refused to think too much about it.	0	1	2	3
42. I asked advice from a relative or friend I respected.	0	1	2	3
43. I kept others from knowing how bad things were.	0	1	2	3
44. I made light of the situation; I refused to get too serious about it.	0	1	2	3

Go on to next page

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0 = Does not apply or not used 1 = Used somewhat 2 = Used quite a bit 3 = Used a great deal

45. I talked to someone about how I was feeling. 0 1 2 3
46. I stood my ground and fought for what I wanted. 0 1 2 3
47. I took it out on other people. 0 1 2 3
48. I drew on my past experiences; I was in a similar situation before. .. 0 1 2 3
49. I knew what had to be done, so I doubled my efforts to make things work. 0 1 2 3
50. I refused to believe that it had happened 0 1 2 3
51. I promised myself that things would be different next time. 0 1 2 3
52. I came up with a couple of different solutions to the problem. 0 1 2 3
53. I accepted the situation, since nothing could be done. 0 1 2 3
54. I tried to keep my feeling about the problem from interfering with other things. 0 1 2 3
55. I wished that I could change what had happened or how I felt. 0 1 2 3
56. I changed something about myself. 0 1 2 3
57. I daydreamed or imagined a better time or place than the one I was in. 0 1 2 3
58. I wished that the situation would go away or somehow be over with. 0 1 2 3
59. I had fantasies or wishes about how things might turn out. 0 1 2 3
60. I prayed. 0 1 2 3
61. I prepared myself for the worst. 0 1 2 3
62. I went over in my mind what I would say or do. 0 1 2 3
63. I thought about how a person I admire would handle this situation and used that as a model. 0 1 2 3
64 I tried to see things from the other person's point of view. 0 1 2 3
65. I reminded myself how much worse things could be. 0 1 2 3
66. I jogged or exercised. 0 1 2 3

Stop Here.

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APPENDIX G
FOLLOW-UP LETTER
FOR INDIVIDUALS AT RISK

Dear (Participant's name),

Thank-you for volunteering to participate in this study. Part of this study involved the completion of the Eating Disorder Inventory. Your score on this questionnaire is considered high which may be suggestive of irregular eating patterns, behaviours and attitudes. There are community resources available should you wish information or counselling regarding healthy food choices and eating strategies. These are listed below:

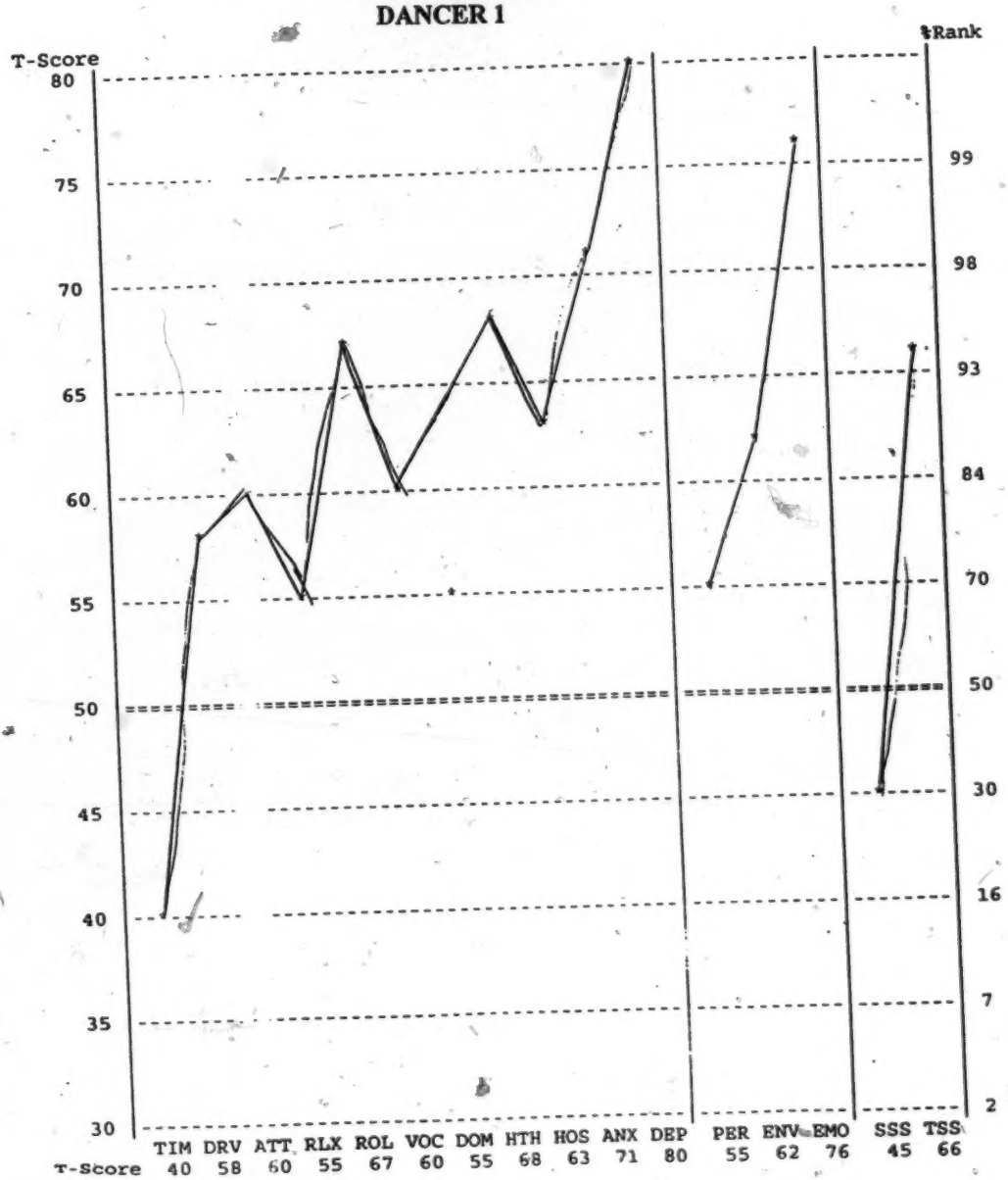
THE APPROPRIATE RESOURCES FOR EACH GEOGRAPHICAL REGION WILL BE GIVEN TO EACH INDIVIDUAL.

If you require any further information, please do not hesitate to contact me at (403) 433-4520.

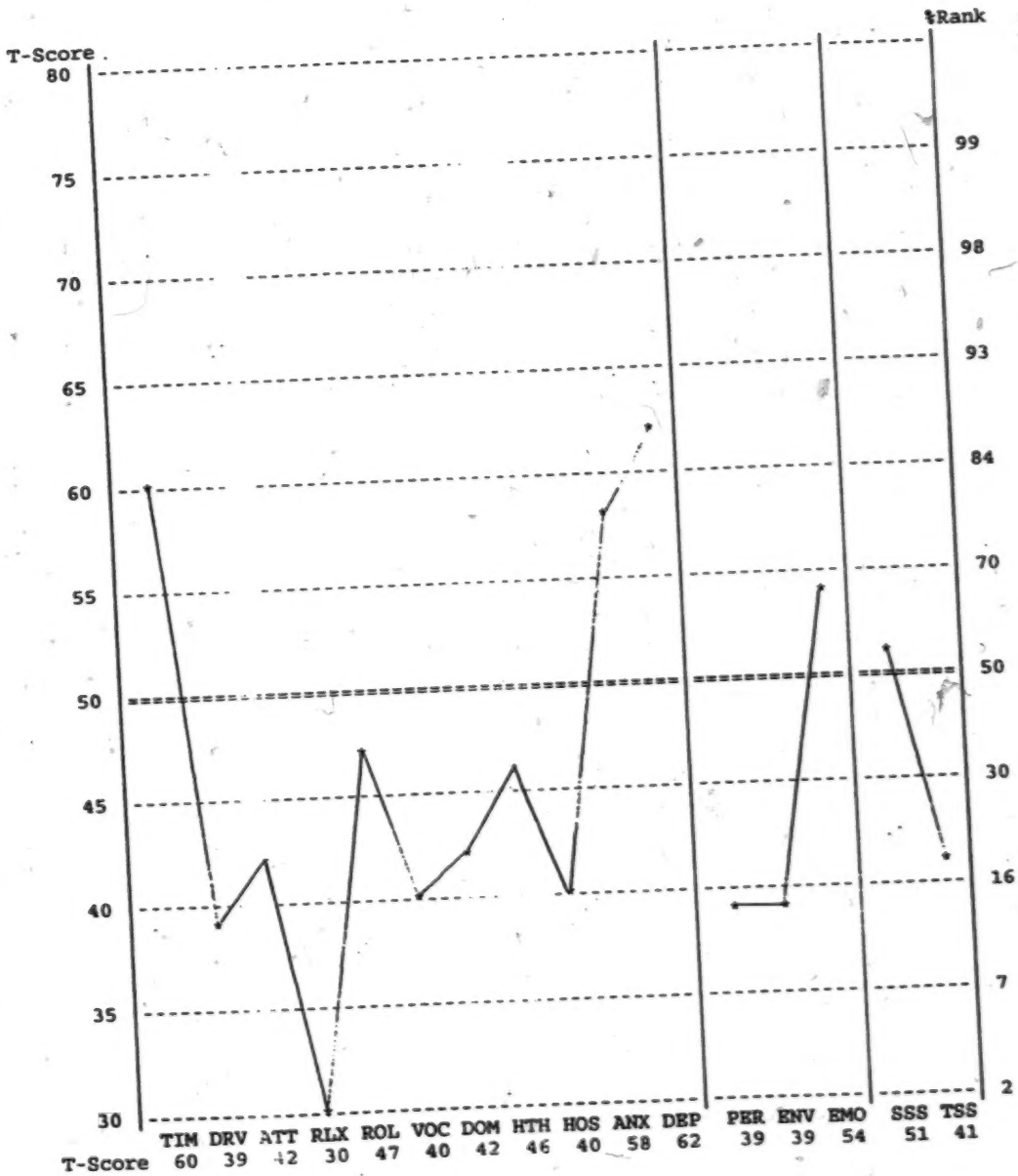
Yours sincerely,

Cynthia Puddu

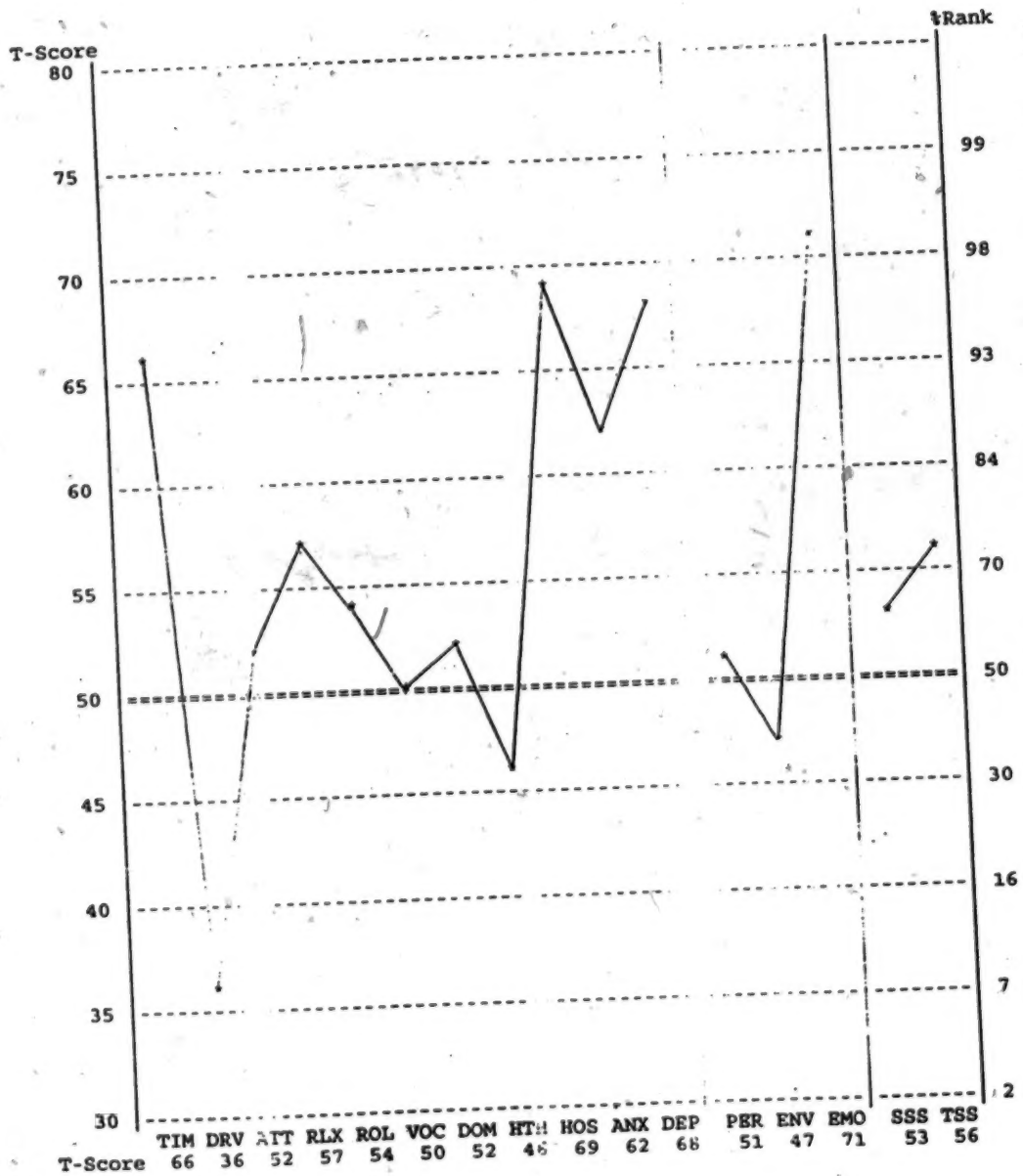
APPENDIX H
DSP GRAPHIC PROFILE
DANCER 1



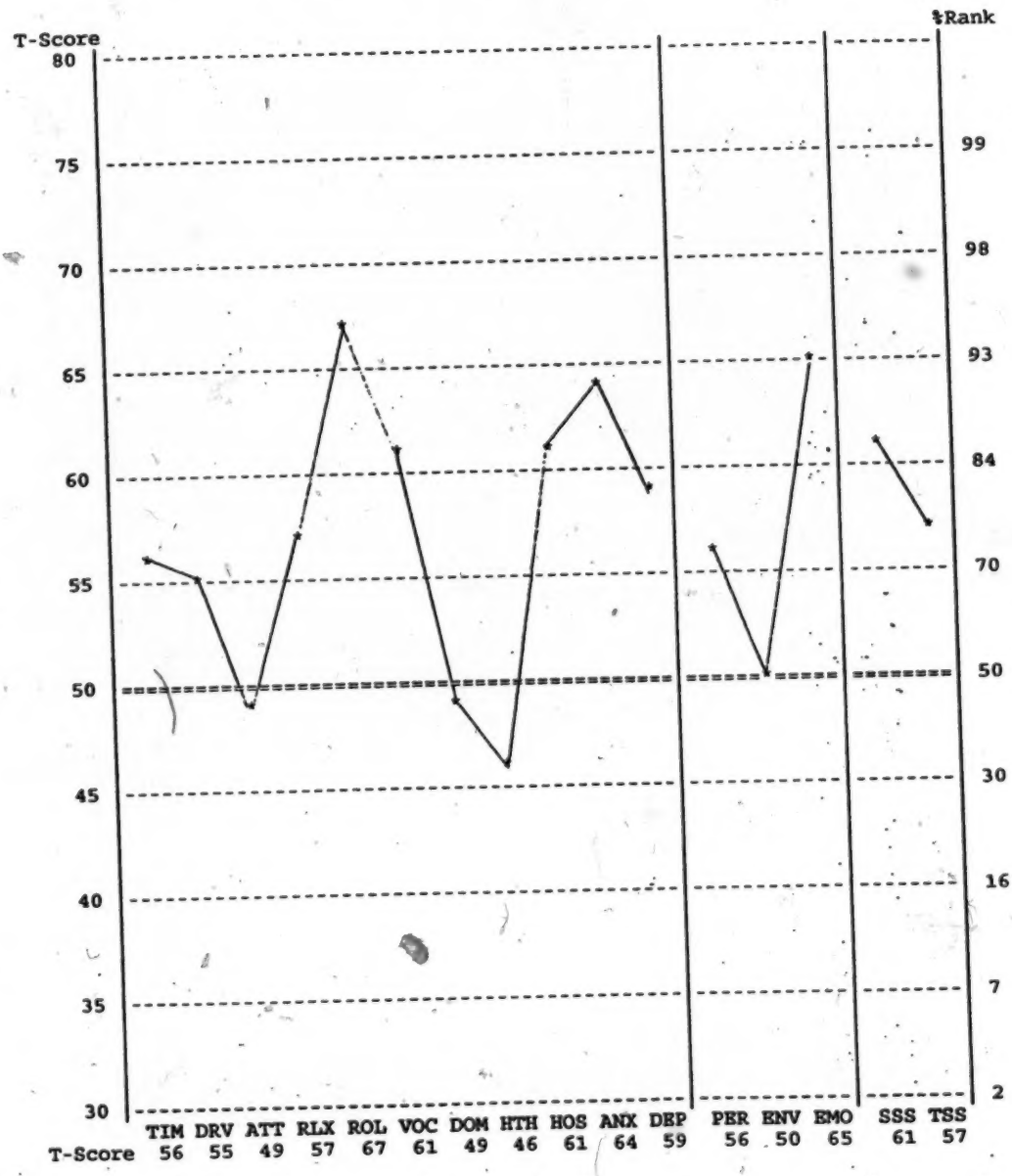
APPENDIX 1
DSP GRAPHIC PROFILE
DANCER 2



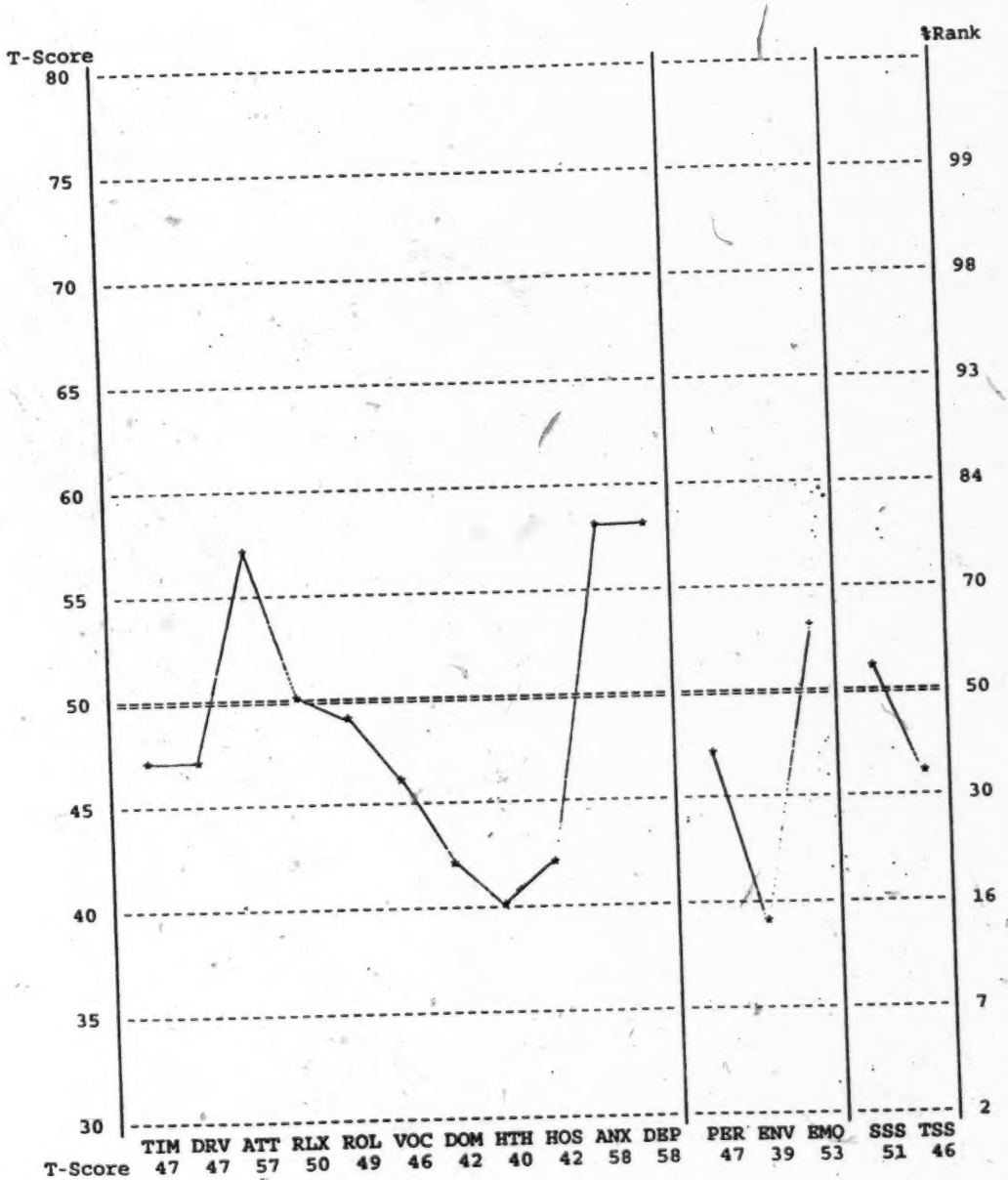
APPENDIX J
DSP GRAPHIC PROFILE
DANCER 3



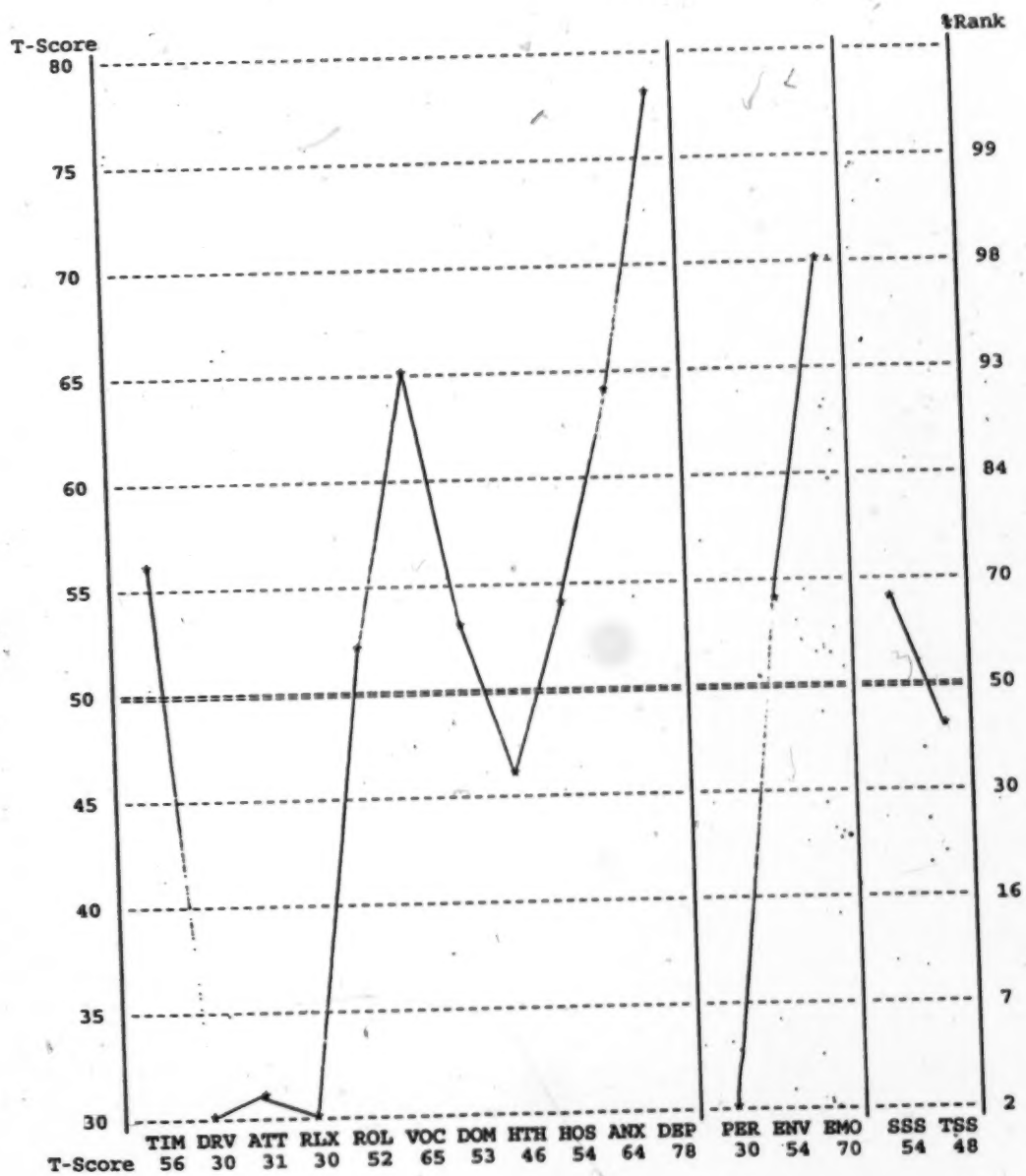
APPENDIX K
DSP GRAPHIC PROFILE
CONTROL 1



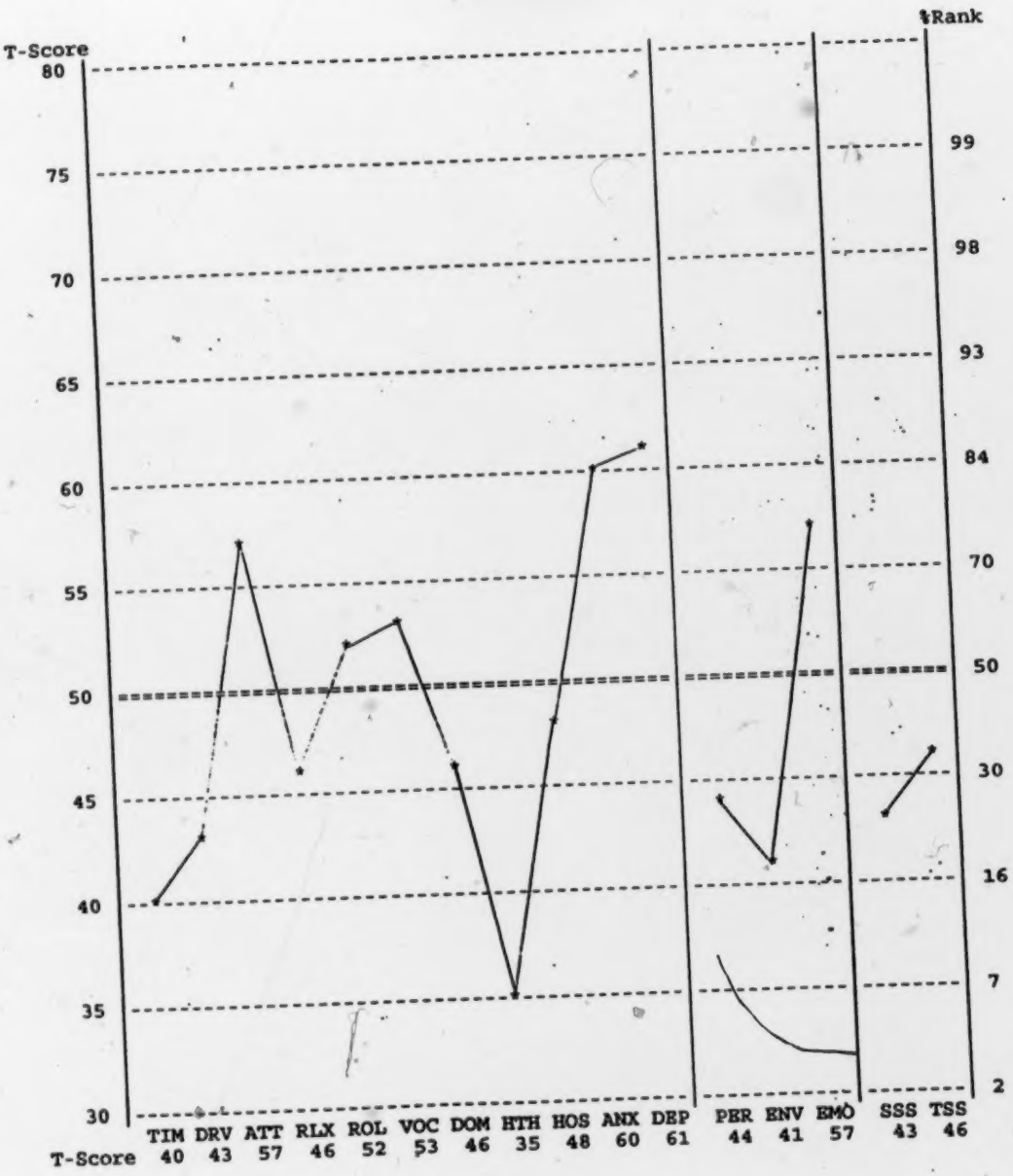
APPENDIX L
DSP GRAPHIC PROFILE
CONTROL 2



APPENDIX M
DSP GRAPHIC PROFILE
CONTROL 3



APPENDIX N
DSP GRAPHIC PROFILE
CONTROL 4



APPENDIX 0

FIELD HOCKEY RECRUITMENT LETTER

Dear Athlete,

I am part of a research team at the University of Alberta that is conducting a study to determine the relationship of stress and stress coping to eating behaviours in female athletes. It has been shown that high levels of stress and inappropriate coping mechanisms can influence eating behaviours. Problem eating behaviour can in turn lead to other conditions such as decreased bone mineral density and irregular menstrual function. Therefore, it is important to understand the relationship between stress, coping and eating behaviour in order to prevent future problems.

You have been selected as a possible candidate for this study because of your affiliation with the Canadian National Field Hockey Team. We are collecting data on a variety of sport settings. The study will require approximately 1 ½ hours of your time. As a result of your participation, you will have an assessment of your stress levels, your coping mechanisms and your eating attitudes behaviour. You will also have your body composition assessed by a sum of 5 skinfolds, done by a trained anthropometrist.

We believe that the results of these kinds of studies are important in raising awareness of female athlete health and in determining ways to increase the health of elite athletes. By determining factors that may influence an athletes health we may be able to design programs that may protect against future health problems.

I have attached some further information about the study and an informed consent form. If for any reason you do not want to complete the study or portions of the study you may refuse to participate at any time with no problems. If you have any questions please feel free to contact me at (403) 433-4520, at any time.

Sincerely,

Cynthia Puddu

APPENDIX P

DANCER RECRUITMENT LETTER

Dear Dancer,

I am part of a research team at the University of Alberta that is conducting a study to determine the relationship of stress and stress coping to eating behaviours in female athletes. It has been shown that high levels of stress and inappropriate coping mechanisms can influence eating behaviours. Problem eating behaviour can in turn lead to other conditions such as decreased bone mineral density and irregular menstrual function. Therefore, it is important to understand the relationship between stress, coping and eating behaviour in order to prevent future problems.

You have been selected as a possible candidate for this study because of your affiliation with a national calibre ballet company. We are collecting data on a variety of physical activity settings. The study will require approximately 1 ½ hours of your time. As a result of your participation, you will have an assessment of your stress levels, your coping mechanisms and your eating attitudes behaviour. You will also have your body composition. This will be done by myself using an instrument that is used to measure the amount of fat under your skin. This is a very simple procedure and will not cause you any discomfort.

We believe that the results of these kinds of studies are important in raising awareness of female athlete health and in determining ways to increase the health of elite athletes. As a dancer, I feel that this study is important because it will help identify factors that may influence dancers' health. By determining these we may be able to design programs that may protect against future health problems.

I have attached some further information about the study and an informed consent form. If for any reason you do not want to complete the study or portions of the study you may refuse to participate at any time with no problems. Also, if you would like the results of the study and your questionnaire and measurements, I will send them to you at the address you indicate on the following page. Your results will be known only to the research staff and to you. No one in your company will have access to your results. If you have any questions please feel free to contact me at (403) 433-4520, at any time.

Sincerely,

Cynthia Puddu

APPENDIX Q

LETTER TO ARTISTIC DIRECTOR

Dear Artistic Director,

I am part of a research team at the University of Alberta that is conducting a study to determine the relationship between stress, coping and eating behaviours in elite calibre, female athletes. Some research has shown that there is a relationship between stress, coping and eating behaviour in the general population. Recent research has suggested that an elite athletic training environment (eg. national team, ballet company, figure skating club) may provide stress in addition to what is normally encountered in every day life. We would like to determine if this additional stress plays a major role in eating behaviour and health. If it does, then the teaching of stress management strategies may be important in these athletic environments. We believe that it is important to target eating behaviours because if problems develop in this area, they can lead to more serious issues such as decreased bone mineral density and irregular menstrual patterns. These can be very detrimental to a dancer's career.

This study would require approximately 1 ½ hours of the dancer's time. During this time we will ask the dancers to fill out three questionnaires (stress, coping and eating attitudes and behaviours), and we will be taking height, weight, and 5 skinfold measurements (triceps, biceps, subscapular, supra iliac and mid-calf) to measure body composition.

Participation in this study is strictly voluntary and the dancers co not have to participate in all portions of the study and the can quit at any time. Also, the dancers names and the name of your company will be kept strictly confidential at all times. Also, if at any time we feel that one of your dancers may be at risk for a problem, we will contact them individually and give them suggestions for obtaining the proper help. The results of the study will be known only to the research staff and to each individual dancer if requested. Any other members of your company will not have access to the results.

We believe that the results of these kinds of studies are important in raising awareness of female athlete health and in determining ways to increase the health of elite athletes. As a dancer, I feel that this study is important because it will help identify factors that may influence dancers' health. By determining these we may be able to design programs that may protect against future health problems.

Enclosed you will find some further information about the study and an informed consent form. If you have any questions about this study, please feel free to contact me at any time at (403) 433-4520.

Sincerely,

Cynthia Puddu